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ABSTRACT

One of four individualized courses included in a radio and television repair, curriculum, this course focuses on trouble-shooting procedures for both black and white and color television equipment. The course is comprised of ten units: (1) Introduction to/and Block Diagrams of Television, (2) Television Audio Section Troubles, (3) Television Video Section Troubles, (4) Television AGC Troubles, (5) Television Sweep Section Troubles, (6) Television High Voltage and Power Supply Troubles, (7) Introduction to Color Television, (8) Television Color Section Troubles, (9) Television Troubleshooting Summary, and (10) Antennas. Each unit begins with a Unit Learning Experience Guide that gives directions for unit completion. The remainder of each unit consists of Learning Activity Packages (LAP) that provide specific information for completion of a learning activity. Each LAP is comprised of the following parts: objective, evaluation procedure, resources, procedure, supplemental sheets, study guide, and a LAP test with answers. The course is preceded by a pretest which is designed to direct the student to units and performance activities. (LRA)

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ED197190

MOUNTAIN PLAINS LEARNING EXPERIENCE GUIDE:
Radio and T.V. Repair.

Course: Television Repair.

CE 027 820

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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Date Published: 3/2/77

Mountain-Plains Education &
Economic Development
Program, Inc.

Glasgow AFB, Montana 59231

Learning Experience Guide

COURSE: TELEVISION REPAIR

DESCRIPTION:

In the Television Repair Course troubleshooting procedures are presented. Various problems and symptoms, for each of the television set sections, are deat with for both black and white and color equipment. The principles for component and set sections operation found only in television equipment are included within this course. Practice in application of troubleshooting procedures and installation of television antennas are also included.

RATIONALE:

An efficient serviceman uses a systematic means to locate difficulties in television sets. Part of becoming efficient is developing knowledge about equipment principles and characteristics. The understanding and practicing of effective procedures are also important steps to becoming a skilled serviceman.

OBJECTIVE:

Given service manual, tools, equipment, students will service; diagnose difficulties; make necessary adjustments; remove, repair, and replace parts for television receivers and MATV distribution systems.

Successful achievement will be indicated by:

1. Properly functioning set according to the manufacturer's standards;
2. Adherence to predetermined procedures as stated on a performance checklist; and
3. 80% accuracy on multiple choice objective tests.

PREREQUISITES:

Occupational preparation prerequisites are:

Electrical Curriculum Area Courses: (a) DC Circuits, (b) AC Circuits (c) Basic lio [illegible]

Foundation Education Prerequisites: Communication Skills - Level H

Principal Author(s):

RESOURSES:

1. Printed Materials
    - a. Television Symptom Diagnosis: An Entry Into T.V. Servicing, Howard W. Sams and Company, Inc., 1971.
    - b. Television Symptom Diagnosis Student Response Manual, Howard W. Sams and Company, Inc., 1971.
    - c. Photofact Television Course, Howard W. Sams Co., Inc., 1975.
    - d. Transitor TV Training Course; Robert G. Middleton, Howard W. Sams Co., 1973.
    - e. Color TV Training Manual, Howard W. Sams Co., Inc., 1974.
    - f. Introduction to Antennas, Louis M. Dezettel. Tandy Corp. 1975.
2. Audio Visuals
    - a. Television Symptom Diagnosis, thirty-three five-minute film loops, Hickok Teaching Systems, Inc.
3. Equipment
    - a. Television Symptom Diagnosis Trainer, Hickok Teaching Systems, Inc.
    - b. Television Analyst, B&K Model 1077.
    - c. Instruction Manual for 1077 Television Analyst, B&K Division of Dynascan Corporation, 1968.

GENERAL INSTRUCTIONS:

As a student in this course you will be assigned activities that explain the principles, concepts and diagnostic procedures. Generally, you will independently read a text manual for an explanation of procedures and concepts. Film loops are viewed at a media station in the electrical laboratory to further explain diagnostic steps. Practice is performed on a trainer and television set. You use a student response manual to record replies to questions about the concepts, symptoms, diagnostic procedures and malfunctions. You are expected to very carefully follow outlined safety practices and procedures. If questions or problems arise, you are to contact the instructor. You will proceed as directed in the LAPs for a prescribed unit. When you finish the unit, you will begin a unit evaluation process before taking the next unit.

UNIT TITLES:

.01 Introduction to/and Block Diagrams of Television
.02 Television Audio Section Troubles
.03 Television Video Section Troubles.
.04 Television AGC Troubles
.05 Television Sweep Section Troubles
.06 Television High Voltage and Power Supply Troubles
.07 Introduction to Color Television
.08 Television Color Section Troubles
.09 Television Troubleshooting Summary
.10 Antennas

FOLLOW-THROUGH:

You have already been prescribed into a unit in this course. After reading this course guide, you are to read the guide for the first prescribed unit. You are expected to use the knowledge acquired in the prerequisite occupational preparation, foundation education, and support courses.

Student: ______________________ **File Code:** 77.04.00.00.A2-2

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

COURSE TEST: TELEVISION REPAIR

77.04.01.01

1. If a TV is operating and no picture is present but there is scanning, the white picture is called:

   a. raster
   b. audio
   c. liner
   d. video

2. How many fields are reproduced per second by a set when scanning a picture?

   a. 2
   b. 262 ½
   c. 1
   d. 525

3. What is the signal characteristic of the audio in a TV set?

   a. FM Stereo
   b. FM
   c. AM
   d. Shortwave

77.04.01.02

4. What channels does the UHF band cover on a TV?

   a. 2-13
   b. 13-14
   c. 14-84
   d. 1-2

5. The basic purpose of the intermediate frequency amplifier in a TV set is to:

   a. Amplify sync signals
   b. Detect video
   c. Ampl[illegible] the [illegible]
   [illegible] Det[illegible] a[illegible]

77.04.01.02 continued

6. Which circuit does the volume control sit?

   a. speaker
   b. audio detector
   c. sound I.F.
   d. audio amp.

77.04.01.03

7. What insures that the horizontal scan rate is correct?

   a. I.F. amp.
   b. sync pulse
   c. A.A.C.
   d. A.F.C.

8. The video amp handles four signals. They are the sync, agc, video, and:

   a. A.M. signal
   b. R.F. signal
   c. sound
   d. A.F.C.

9. The horizontal output goes to the AFC, yoke and _____ circuit.

   a. hi-voltage supply
   b. tuner
   c. video
   d. color

10. The high-voltage power supply provides the power to operate the:

   a. yoke
   b. picture tube
   c. tuner
   d. sound amplifier

88.04.01.04

11. In which TV section is the contrast control?

   a. hi-voltage section
   b. video detector
   c. video I.F.
   d. video amp

[illegible] oscillat [illegible] re:

   a. not on solid state sets
   b. no, on all sets
   c. only on color sets
   d. not on black and white sets

77.04.01.04

13. If you had no audio in a TV receiver, but the tuner, I.F. and video circuits checked all right, what section would you troubleshoot?

    a. tuner and antenna
    b. sync
    c. audio
    d. power supply

14. Television repairmen use black diagrams to help them trace the flow of ________ through a receiver.

    a. voltage
    b. signals
    c. current
    d. power

77.04.02.01

15. Referring to L 12 of the sound if section, what is your symptoms if C 27 shorted? (See diagram 3)

    a. transformer would burn up
    b. no audio, but have a low hum
    c. no sound at all
    d. good audio

16. What kind of circuit does a power amplifier have in an audio circuit of a TV when it is using 2 transistors to operate the speaker?

    a. speaker
    b. push-pull
    c. pull-pull
    d. push-push

17. In the video section, what would happen if A9 of the transformer L8 opened up? (See diagram 2)

    a. lose video
    b. poor sound
    c. lose audio
    d. poor video

77.04.02.02

18. The raster [illegible] video [illegible] the picture rolls horizontally across the screen. What [illegible] sh

    a. vertical sync
    b. horizontal A.F.C.
    c. horizontal output
    d. sync section

77.04.02.02 continued

19. Black and white TV symptoms can be divided into sound symptoms, video symptoms and:

    a. raster symptoms
    b. adjustment trouble
    c. antenna trouble
    d. tune

20. The audio in a TV set is weak in volume, what part of the audio section would you troubleshoot?

    a. detector
    b. power amplifier
    c. video output

21. The raster and audio are normal, but all you have on the screen is snow. What section would you troubleshoot?

    a. low-voltage power supply
    b. tuner
    c. video section
    d. sync section

22. If you had normal audio but your raster didn't completely fill out the screen, what section would you troubleshoot?

    a. video section
    b. tuner
    c. low-voltage power supply
    d. high-voltage power supplies.

    77.04.02.03

77.04.02.03

23. In a color TV, can you have good vertical sync but still have poor horizontal sync?

    a. no
    b. yes
    c. yes, but only in a color TV
    d. no, because the sync separator is working

24. If you diagnosed a TV with a white line on a black background running from left to right on your screen what section would you troubleshoot?

    a. high-voltage [illegible]
    b. horizontal sweep
    c. low-voltage power supply
    d. vertical sweep

77.04.02.03 continued

25. If the raster didn't completely fill the screen on all four sides of a television receiver, what part of the TV would you troubleshoot?

    a. hi-voltage power supply
    b. low-voltage power supply
    c. horizontal output stage
    d. video output

77.04.02.04

26. In a transistorized audio amp circuit, the collecter of the audio output transistor is usully connected to the:

    a. resistor
    b. transformer, primary side
    c. speaker
    d. transformer, secondary side

27. A power transistor in an audio output amplifier can be tested by removing it from the circuit and measuring the terminal:

    a. resistances
    b. voltager
    c. current
    d. watts

28. What is the only thing necessary to troubleshoot an intergrated circuit?

    a. an ohmmeter
    b. replace all the parts
    c. an ammeter
    d. a voltmeter

29. In a transistor audio amp circuit, there is a 180 degree phase shift from the transistor ____ to its collecter.

    a. case
    b. transformer
    c. base
    d. emitter

30. What type of tube is used as a sound detector in a TV audio circuit?

    a. tetrode
    b. tri
    dio
    d. pentode

77.04.02.05

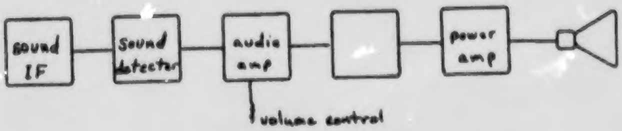
31. About what percent of the collecter supply voltage should the collecter to emitter voltage read in a transistorized TV?

a. 75%
b. 100%
c. 90%
d. 50%

77.04.02.06

32. In the following block diagram, what section is missing?

a. Speaker
b. video amp
c. driver amp
d. sync section



33. If your video is very faint, what part of the section in the TV set would you troubleshoot?

a. detector
b. audio output
c. video amp
d. sound I.F.

77.04.02.07

34. In a TV receiver, if you have poor sync, will this effect the audio?

a. maybe, if you have good video
b. no
c. yes, if it is a color set
d. yes

35. If the horizontal A.F.C. circuit is bad, would this effect the audio section?

a. yes
b. yes, if there is an oscillator problem
c. no
d. yes, if the vertical sync is bad also

36. What effect would a low-voltage power supply have on a TV besides loss of voltage?

a. s[illegible] hu[illegible]
b. low volume
c. loss of hi-voltage
d. no audio

77.04.02.08

37. If transistor Q7 had an emitter-collector short, would it trip the circuit breaker? (See diagram 4)

a. no, it would burn up C 319 capacitors
b. no
c. yes
d. no, it would burn up R 318

38. What is your bias voltage on Q6 transistor? (See diagram 5)

a. 2.2 volts
b. 1.0 volts
c. 1.6 volts
d. 23.5 volts

39. What is the bias voltage on Q8 transistor? (See diagram 6)

a. 4.45 v
b. 5.06 v
c. 76 v
d. 9.0 v

40. What frequency would you adjust A9 to in the audio I.F.? (See diagram 6)

a. 15.750 HZ
b. 4.5 MHZ
c. 450 MHZ
d. 60 HZ

41. What is the frequency of the transformer T300? (See diagram 4)

a. 60 HZ
b. 4.5 MHZ
c. 8.10 MHZ
d. 15750 HZ

77.04.03.01

42. If a TV has a component failure which affects the video reproduction, the trouble must lie in the picture tube or in the:

a. A.G.C.
b. I.F. amplifier
c. tuner
d. video amplifier

Electron movement off a cathode is called:

a. beam
b. space charge
c. secondary emission
d. emission

77.04.03.01

44. What is another name for the heater in a crt?

a. grid
b. anode
c. cathode
d. filament

77.04.03.02

45. The device which is used to check the emission of a picture tube is called:

a. a V.O.M.
b. an oscilloscope
c. a crt checker
d. a hi-voltage probe

46. Which section is the sync pulse taken from?

a. video output
b. contrast control
c. AGC
d. first video amp

47. What kind of coupling usually occurs in the video circuit of a TV set?

a. capacitive
b. transformer
c. direct
d. resistive

77.04.03.03

48. What is the purpose of the diode, D100, in this set? (See diagram 4)

a. zenier diode
b. bias regulator
c. audio detector
d. video detector

49. What element of the picture tube has the high voltage on it?

a. the first anode
b. the aquadag
c. the cathode
d. the [illegible]

50. What is the purpose of the video bias control? (See diagram 4)

a. frequency control
b. regulation of the 80 v
c. auxilliary brightness control
d. video amp bias

77.04.03.03 continued

51. What test instrument can be used to determine whether any video information is on the grid of a video output tube?

    a. VTVM
    b. oscilloscope
    c. VOM
    d. B + K analyst

77.04.03.04

52. If a TV set has snow and good sound but no picture, can this problem be classified as a video problem?

    a. possibly
    b. no
    c. occassionally
    d. yes

53. What attracts the electron towards the screen of the picture tube?

    a. the phosphorus coating
    b. the cathode
    c. the second anode
    d. the magnetic field

77.04.03.05

54. What is another name for an electron gun?

    a. first anode
    b. cathode
    c. grid
    d. second anode

55. Which will have more stages of amplification, a tube-type set or a transistor set?

    a. tube
    b. transistor
    c. both have the same number
    d. neither

56. The difference between light and dark on the screen of a TV is defined as:

    a. sync
    b. emission
    c. brightness
    d. contrast

77.04.03.06

57. Besides losing audio, video, and A.G.C., what else will be lost if the first video amp fails completely?

    a. horizontal drive
    b. vertical drive
    c. sync
    d. color

58. What stage of the video section will affect both sound and picture?

    a. brightness control
    b. contrast control
    c. video output
    d. detector

59. What happens to the raster when the contrast control is turned up?

    a. brightens
    b. loses sound
    c. rolls vertically
    d. darkens

77.04.03.07

60. What type of tube is the video output tube in this set? (See diagram 8)

    a. pentagrid
    b. triode
    c. tetrode
    d. pentode

61. If no collector voltage is present on 09, what would probably be the problem? (See diagram 6)

    a. R22 open
    b. R20 open
    c. R52 open
    d. R49 open

62. If the resistor, R52, was burned up, what would be the indication?

    a. a short in the B+
    b. L7 shorted
    c. shorted video output
    d. shorted video [illegible]

63. Above the brightness control, the symbol marked 7 video board means:(See diagram

    a. it is an optional connection
    b. at connection goes to pin 7, video board
    c. that point has 7 ohms to the video board
    d. R3 control plugged into pin 7 of the video board

77.04.03.08

64. What would weak video look like on a crt?

a. low contrast
b. bent video
c. distorted raster
d. low brightness

77.04.03.09

65. Besides detecting video, a video detector is also responsible for another function. What is this other function?

a. detecting audio
b. clarifying the I.F. signal
c. detecting sync
d. interpreting A.G.C.

66. What is the common number of I.F. stages found in American-made TV sets?

a. four
b. five
c. three
d. two

77.04.03.10

67. If a TV set displays a fuzzy picture or a loss of detail, what section should the repairman troubleshoot?

a. sound take-off
b. video
c. video detector
d. I.F. amplifiers

77.04.03.11

68. In figure #9, what measurement is taken at T.P. 3B?

a. base voltage of the second I.F. amp
b. collector voltage of second I.F. amp
c. resonant frequency of that transformer
d. emmitter voltage of the second I.F. amp

69. What is the frequency of the video information being amplified in an I.F. section of a TV set?

a. 46 MHZ
b. 41.25 MHZ
c. 45.75 MHZ
d. 42.17 MHZ

77.04.03.11 continued

70. The picture I.F. amplifier must amplify a band of signal frequencies from about 41 MHZ up to about:

- a. 45.75 MHZ
- b. 46 MHZ
- c. 41.25 MHZ
- d. 15.750 MHZ

77.04.03.13

71. What stage of the tuner is the output of the oscillator connected to?

- a. first I.F. amp
- b. R.F. amp
- c. A.G.C.
- d. mixer

72. What part of a tuner is the antenna associated with?

- a. R.F. amp
- b. oscillator
- c. detector
- d. mixer

73. If a TV is displaying an excessive amount of snow, what section is probably causing the trouble?

- a. oscillator
- b. first I.F. amp
- c. mixer
- d. R.F. amp

77.04.03.14

74. What is the frequency difference between the local oscillator and the R.F. amp?

- a. 83 MHZ
- b. the I.F. frequency
- c. 455 KC
- d. 129 MHZ

77.04.03.15

75. What is the proper title for the T201 coil in the antenna board? (See diagram

- a. matching bridge
- b. fixed transformer
- c. input circuit
- d. Balun coil

77.04.03.16

76. An oscillator failure is very similar to the failure of the:

    a. first I.F. amp
    b. third I.F. amp
    c. mixer
    d. oscillator

77. Why is it necessary to have a feedback circuit in a tuner oscillator circuit?

    a. to maintain frequency drift
    b. to determine what frequency it will operate on
    c. for self-bias
    d. to keep it running

78. What three stages make up a tuner?

    a. detector, tuning shaft, and mixer
    b. tuning shaft, oscillator, and detector
    c. mixer, R.F. amp, and oscillator
    d. fine tuner, R.F. amp, and detector

79. What device does a UHF tuner use for mixing signals?

    a. a tube
    b. a transistor
    c. a diode
    d. a RC circuit

80. In a TV set, the A.G.C. amp gets its incoming signal from:

    a. I.F. amp
    b. R.F. amp
    c. the A.G.C. keying circuit
    d. the horizontal sweep

77.04.04.02

81. To obtain a good signal-to-noise ratio, the R.F. amp is operated at:

    a. a low gain level
    b. a high A.G.C. level
    c. a low noise level
    d. full gain

82. If the [illegible] be

    a. snowy
    b. washed out
    c. normal
    d. bent

77.04.04.03

83. A.G.C. is advantageous for TV receivers because it:

    a. develops the necessary audio signal across the resistor
    b. keeps the picture intensity constantly roaming
    c. keeps the price of manufacturing down to a minimum
    d. keeps the picture intensity fixed at one level

84. If the incoming signal gets stronger, the A.G.C. will:

    a. become weaker
    b. remain the same
    c. get stronger
    d. will turn positive

77.04.04.04

85. What switches the keying transistor in the A.G.C. circuit on and off?

    a. The A.G.C. amp
    b. a diode
    c. the video signal
    d. the horizontal sweep pulse

77.04.04.05

86. If a TV has a blank raster with no sound and some hum, what section should the serviceman troubleshoot?

    a. tuner
    b. I.F. amp
    c. video amp
    d. A.G.C.

77.04.04.06

87. There is some snow, no audio and no video, with a normal raster on a TV set. What section should the repairman troubleshoot?

    a. the first I.F. amp
    b. the video
    c. the oscillator in the tuner
    d. the video output

88. The raster and video are normal, but the overall picture is dark. Which section should the serviceman troubleshoot?

    a. video output
    b. the video amp
    c. the picture tube
    d. the A.G.C.

77.04.04.08

89. The raster is normal, but the sound is weak and the video is displaying a good amount of snow. Where should the repairman first look for trouble?

   a. Mixer and oscillator
   b. R.F. amp or antenna
   c. A.G.C. and mixer
   d. I.F. strip

77.04.04.09

90. The raster and video are normal, but the overall picture is dark. Which section should the repairman troubleshoot?

   a. picture tube
   b. video amp
   c. A.G.C.
   d. video output

91. The audio and raster are normal, but the video is weak. What section should the repairman troubleshoot?

   a. oscillator
   b. R.F. amp
   c. I.F. amps
   d. mixer

77.04.04.10

92. Why is it not possible to view the signal in the I.F. section of a TV set?

   a. the existence of a pulse voltage
   b. the frequency is too high
   c. voltage is too low
   d. the signal is unstable

77.04.05.01

93. If a problem exists in the sync-separator circuit, the symptoms will be:

   a. vertical rolling only
   b. no A.G.C.
   c. vertical and horizontal rolling
   d. horizontal rolling only

[illegible] What is [illegible] from [illegible] the picture both vertically and horizontally?

   a. horizontal sync
   b. sync pulse
   c. video
   d. vertical sync

77.04.05.01

95. When a technician is able to vary the picture with the horizontal hold control, this tells him that:

   a. there is not a sweep problem
   b. a sweep problem exists
   c. a vertical sweep problem exists
   d. a vertical sync problem exists

77.04.05.02

96. The control used to adjust the vertical stability is the:

   a. vertical hold control
   b. horizontal hold control
   c. A.G.C. control
   d. vertical height control

97. The control used to adjust the horizontal stability is the:

   a. horizontal width control
   b. vertical hold control
   c. A.G.C. delay
   d. horizontal hold control

77.04.05.03

98. Why can't the vertical sweep retrace line be seen on the TV screen?

   a. the picture is blanked out
   b. it blends with horizontal lines
   c. it's too fast to be seen
   d. it blends with the vertical lines

99. If a TV set has its picture move from top to bottom and cannot be stopped, what might be the trouble?

   a. damage to the horizontal sync
   b. malfunctioning sync amp
   c. vertical sync amp
   d. bad sync separator

77.04.05.05

100. When troubleshooting, what should be checked after the voltage in the sync separator is checked?

   a. waveform
   b. resistance
   c. inductance
   d. capacitance

77.04.05.05

101. What is the frequency of the signal pulse coming from the sync separator going to the sync amp in the sync section of a TV?

a. 455 HZ
b. 41.75 HZ
c. 60 HZ
d. 15,750 HZ

77.04.05.06

102. What is defined as the processes and signals which cause the picuture to be scanned vertically?

a. vertical sync
b. vertical flyback or retrace
c. vertical hold control
d. vertical sweep

103. If a TV set has a distorted raster, this would indicate a malfunctioning:

a. Sync separator
b. crt
c. video
d. power supply

77.04.05.07

104. The sound and raster are normal, but the picture is rolling. What might be the problem?

a. sync separator
b. vertical sync amp
c. horizontal A.F.C.
d. local oscillator

105. A TV set has normal raster and video, but no audio and no hum. What section might be at fault?

a. audio amp
b. audio detector
c. video output
d. volume control

106. A TV set has both normal sound and raster, but the video is floating. Where does the problem [illegible]

a. sync amp
b. sync separator
c. vertical sync amp
d. horizontal A.F.C.

77.04.05.09

107. What does the phase inventer do to the signal of the horizontal circuit?

a. converts a positive wave into a negative wave
b. amplifies the signal
c. smooths the pulse
d. changes the frequency

77.04.05.10

108. What is the frequency of the horizontal oscillator?

a. 41.75 HZ
b. 455 HZ
c. 60 NZ
d. 15,750 HZ

109. What component do most TV manufacturers use for A.F.C. control in a TV set?

a. a capacitor PI network
b. RC network
c. diode
d. R. network

110. How does a horizontal A.F.C. keep the oscillator on frequency?

a. by using a feedback circuit
b. by the sync separator pulses
c. by using the pulse from the vertical integrator
d. by using the voltage from the power supply

77.04.05.12

111. The sound and raster are normal, but the picture is full of lines. What section should be checked?

a. yoke assembly
b. vertical oscillator
c. vertical retrace lines
d. horizontal oscillator

77.04.05.13

112. To prevent undesirable oscillations from interferring with the picture after retrace, what section is added to the circuit?

a. flyback
b. boost
c. damper
d. feedback

77.04.05.13 continued

113. Which area of the picture does the vertical height control primarily affect?

a. bottom
b. right side
c. left side
d. top

77.04.05.14

114. The output of the vertical driver stage goes to the:

a. yoke
b. vertical oscillator
c. vertical output
d. horizontal AFC

115. The circuit which produces the deflection signal is the:

a. vertical-sync pulse
b. vertical output
c. vertical oscillator
d. vertical A.F.C.

77.04.05.15

116. A complete vertical sweep failure will result in:

a. a loss of high voltage
b. a thin, white line running vertically on the screen
c. a complete loss of the raster
d. a thin, white line running horizontally on the screen

117. If a raster is normal with no video and no volume, but the volume control has some effect, the malfunctioning section is the:

a. video amp
b. R.F. amp
c. tuner mixer
d. tuner oscillator

77.04.05.17

118. The raster is normal with weak sound and video. There is also a lot of snow in the picture. What section should the repairman troubleshoot?

a. A.G.C.
b. local oscillator
c. third I.F. amp
d. R.F. amp

77.04.05.18

119. The video and raster are normal, but the sound is dead. The background noise varies with the volume control. What section should be checked?

a. video amp
b. audio output
c. sound detector
d. sound trap

120. The horizontal section will not sync, and the oscillator will not pass through sync. What should be checked?

a. sync separator
b. horizontal oscillator
c. damper
d. yoke

77.04.05.19

121. What will the raster look like on a TV if the yoke fails?

a. keystone or trapezoidal
b. it will shrink on all four sides
c. it will have black hum bars
d. no raster

77.04.05.20

122. The most common cause of poor linearity in a TV is a malfunctioning:

a. power supply
b. tube
c. capacitor
d. resistor

123. The audio and raster on a TV are normal, but the video is missing. The video amp checks O.K. What should be checked next?

a. picture tube
b. horizontal output
c. A.G.C.
d. first I.F. amp

77.04.06.01

124. How much high voltage will be found on a color TV set?

a. 26,000 v
b. 6000 v
c. 15,750 v
d. 950 v

77.04.06.01

125. Why shouldn't the high voltage be set above the manufacturer's recommended level?

a. damage to picture tube
b. damage to components
c. high x-rays
d. affects the focus

126. The focus rectifier obtains its filament voltage from the:

a. filament transformer
b. power transformer
c. flyback transformer
d. low voltage power supply

127. Which of the following is not a method of high-voltage regulation in a color set?

a. shunt regulator
b. horizontal bias oscillator
c. horizontal regulator
d. horizontal bias reguator

128. Any problem that prevents the raster from being its correct size and shape can be considered a:

a. low voltage power supply problem
b. video problem
c. high voltage problem
d. raster problem

77.04.06.03

129. What is the contrast setting on a color set when checking and/or adjusting the high voltage?

a. minimum
b. medium contrast
c. maximum
d. use the service switch on raster position

130. What will cause the high voltage to become too high?

a. damper
b. regulator
c output
d. flyback

77.04.06.04

131. Which of the following is a high voltage problem?

   a. no raster
   b. no sound
   c. no sync
   d. video

132. Will high voltage be developed if the high voltage lead is not connected to the picture tube?

   a. only if it is grounded
   b. on
   c. yes
   d. only if it is in a color set

77.04.06.05

133. What type of power supply should be used when very accurate voltages are needed?

   a. regulated
   b. half-wave
   c. lo filter
   d. full-wave

134. What is the best method for checking a possibly bad filter capacitor?

   a. capacitor checker
   b. substitution
   c. voltmeter
   d. ohmmeter

135. Which type of power supply produces the highest voltage?

   a. bridge rectifier
   b. center trapped half wave
   c. half-wave voltage doubler
   d. full wave

136. What is another name for the cord used to ground one side of the chassis?

   a. grounding cord
   b. 14-2 ground
   c. non-polarized
   d. polarized

[illegible]

137. What precaution should be taken when replacing filter capacitors in a TV set?

   a. working voltage
   b. polarity
   c. connections
   d. physical size

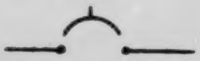
77.04.06.06

138. How can a circuit breaker be checked for workability while the power is off?

a. substitution
b. ammeter
c. ohmmeter
d. B & K analyst

139. What does the following symbol represent?

a. fuse
b. circuit breaker
c. fusable resistor
d. temporary jumper



77.04.06.07

140. What is the normal troubleshooting procedure for a power supply?

a. voltage measurement
b. substitution
c. low voltage probe
d. ammeter

77.04.06.08

141. What will a hum bar do to the raster of a TV set?

a. bend it
b. make it trapezoidal in shape
c. shrink it
d. nothing

142. If a dropping resistor in a power supply was running abnormally hot, what should be checked?

a. the resistor
b. the shorted component that it supplies voltage to
c. the rectifier
d. the filter capacitor

77.04.06.10

143. If the TV set has too much gain, the raster will be:

a. norm
b. bent
c. washed out
d. snowy

77.04.06.13

144. The sound is normal, but there is not enough brightness. What might cause this problem?

- a. crt
- b. power supply
- c. A.G.C.
- d. video amp

145. The sound and raster are normal, but there is no video. However, there is some change when varying the contrast control. This problem could be caused by:

- a. video amp
- b. third I.F. amp
- c. video output
- d. video detector

77.04.06.14

146. No sound and no raster is unually caused by:

- a. the yoke
- b. the I.F. amp
- c. a low voltage power supply
- d. a high voltage power supply

77.04.06.15

147. Severe snow is caused by a bad:

- a. oscillator
- b. mixer
- c. R.F. amp
- d. first I.F. amp

77.04.07.01

148. What color is developed when the basic colors of TV circuitry are mixed?

- a. black
- b. white
- c. blue
- d. reddish yellow

149. What are the three [illegible] color TV circuitry?

- a. green, blue and magenta
- b. red, green and blue
- c. red, yellow and green
- d. blue, yellow and red

77.04.07.01 continued

150. Colors without any white in them are called:

a. saturated colors
b. desaturated colors
c. base colors
d. pastel colors

151. Colors with white in them are called:

a. pastel colors
b. saturated colors
c. base colors
d. desaturated colors

152. What is the frequency of the color signal carrier being transmitted?

a. 3.58 MHZ
b. 15,750 KHZ
c. 455 KC
d. 41.25 MHZ

77.04.07.02

153. What color will develop on a TV screen when yellow and blue are mixed together?

a. light blue
b. brown
c. dark green
d. white

154. What color dots will the green gun of a color CRT activate?

a. blue and green
b. all colors
c. red and green
d. green only

155. What color results when red and green are mixed together on a TV screen?

a. magenta
b. blue
c. dark green
d. yellow

77.04.07.03

156. Another term used to describe the power of color on a crt is:

a. magenta
b. brightness
c. hue
d. saturation

77.04.07.03 continued

157. What color TV control affects the guns in a crt?

a. demodulator controls
b. screen controls
c. drive controls
d. R-Y, B-Y and G-Y controls

77.04.07.04

158. In what section of a tube-type chroma circuit is the tint control located?

a. burst amp
b. A.C.C.
c. 3.58 MHZ oscillator
d. chroma sync

159. What signal or pulse is responsible for gating the burst amp in a tube chroma circuit?

a. 3.58 MHZ
b. A.C.C.
c. color killer
d. flyback

160. What type of oscillator does a color TV use for the 3.58 MHZ signal?

a. crystal
b. tuned plate, tuned grid
c. BFO
d. hartley

161. The main purpose of the color demodulator in a color TV is to:

a. remove the black and white signal
b. provide a sync-pulse
c. remove the color signal from the black and white
d. keep the 3.58 MHZ oscillator on frequency

162. Where do the R-Y, G-Y and B-Y signals go when leaving the chroma section of a color TV?

a. 3.58 MHZ oscillator
b. flyback circuit
c. A.C.C.
d. crt

[illegible]

163. The black and white portion of a color television set is called:

a. chromacolor
b. monochrome
c. chroma
d. non-chroma

77.04.07.05 continued

164. What is another term used for color I.F. stages in a color TV?

    a. demodulator
    b. bandpass amp
    c. 3.58 MHZ oscillator
    d. burst amp

165. Which stage of a color TV compares the color I.F. signal to the color oscillator in order to produce the R-Y, B-Y, G-Y signal?

    a. burst amp
    b. demodulator circuit
    c. phase inverter
    d. color modulator circuit

77.04.07.06

166. Refer to figure #5 in the TV test pamphlet. What section should be checked for probable cause?

    a. burst amp
    b. G-Y amp
    c. R-Y amp
    d. N-Y amp

167. What is wrong with figure #7 in the TV test pamphlet?

    a. too much red
    b. too much green
    c. not enough blue
    d. 60 HZ hum bar

168. Referring to figure #1 of the TV test pamphlet, what is the problem with this picture of the color bars?

    a. nothing
    b. not enough red
    c. inadequate amount of green
    d. too much blue

169. What causes a color picture to look like figure #2 of the TV test pamphlet?

    a. loss of color sync
    b. loss of burst
    c. A.C.C. not working
    d. bad demodulator

170. What is wrong with the picture in figure #3 of the TV test pamphlet?

    a. no blue
    b. 3.58 oscillator
    c. no R-Y signal
    d. no G-Y signal

77.04.07.07

171. What type of color TV does not require degaussing?

a. all types require degaussing
b. sets with screens smaller than 19" in diameter
c. all solid state sets
d. transistorized sets

172. What color should the screen be when adjusted for purity?

a. blue
b. red
c. green
d. yellow

77.04.07.08

173. When is the automatic degaussing circuit activated?

a. when the set is turned off
b. when the set is first turned on
c. when the set has cooled off
d. while the set is on

77.04.07.09

174. What is the last step in degaussing a TV before unplugging the coil?

a. move the coil over the degauss the sides and bottom
b. rotate the coil away from the screen
c. back up from the screen
d. turn the edge of the coil towards the screen

77.04.07.11

175. Which of the following devices is used in the purity adjustment to move the purity pattern on the screen?

a. service switch
b. purity rings
c. degaussing circuit
d. centering rings

176. What material is used to coat the inside of a color crt screen?

a. bacteria
b. light emitting [illegible]
c. phosphor
d. photo-electric cells

77.04.07.11 continued

177. The purity rings of a color TV are located:

a. on the chassis
b. on the yoke
c. on the nect of the picture tube
d. on the convergence board

178. What device, found in a color TV chassis, is used to adjust purity?

a. hi-voltage switch
b. raster switch
c. purity switch
d. service switch

179. What is placed in a color CRT to prevent the electron beam from striking other dots adjacent to it?

a. purity rings
b. aquadag
c. shadow mask
d. yoke position control

77.04.07.12

180. Refer to figure #10 in the TV test pamphlet. What does this color symptom indicate?

a. the screen needs convergence
b. the yoke is pulled back
c. the red screen isn't turned down
d. the yoke isn't working properly

181. The aperature mask in a color crt is constructed of:

a. glass
b. fiberglass
c. plastic
d. metal

77.04.07.13

182. Refer to figure #9 in the TV test pamphlet. Which number represents the purity rings?

a. 3
b. 1
c. 4
d. 2

183. What would happen if the yoke is pushed up too far forward when making a purity adjustment?

a. discoloration of the screen
b. nothing
c. fill out the screen
d. picture distortion

77.04.07.14

184. Where are the static convergence controls located in a color TV?

a. on the yoke
b. on the chassis
c. in front of the yoke
d. behind the yoke

185. By moving the blue magnet, which way will the green dot move?

a. horizontally
b. up and down
c. vertically
d. it won't move

77.04107.15

186. How are magnets used to control the red dot in a static set-up?

a. diagonally
b. vertically
c. horizontally
d. parallel to the red dot

187. The process of aiming the electron beams at the center of a color CRT screen is called:

a. static convergence
b. dynamic convergence
c. focus
d. purity

188. For a convergence pattern, the generator is connected to the:

a. antenna terminals
b. I.F. amp
c. purity rings
d. static magnets

77.04.07.17

189. Which way will the blue dot move when adjusting the blue dot magnet?

a. diagonally
b. vertically
c. horizontally
d. parallel with [illegible]

190. What should usually be the last dot to be converged in a static set-up?

a. blue
b. red
c. green
d. blue-green

77.04.07.17 continued

191. What color will develop when red and green dots converge at the same point?

a. red
b. yellow
c. green
d. blue

77.04.07.18

192. What type of convergence is done for the outside part of the picture tube?

a. dynamic
b. magnetic
c. static
d. purity convergence

77.04.07.19

193. What pattern is used to set-up dynamic convergence in a color CRT?

a. cross-hatch
b. dot
c. color
d. vertical lines

77.04.07.22

194. Refer to figure #9 in the TV test pamphlet. Which number represents the dynamic convergence controls?

a. 3
b. 5
c. not shown
d. 2

195. Is the service switch used in making a dynamic convergence adjustment?

a. no
b. occasionally
c. yes
d. possibly

196. What color should the screen be when making convergence adjustments?

a. gray
b. blue
c. red
d. green

77.04.07.22 continued

197. Where are the controls located to perform a dynamic convergence?

a. neck of the picture tube
b. chassis
c. convergence panel
d. yoke

77.04.07.23

198. An inproper gray scale adjustment will affect:

a. both color and black and white pictures
b. color pictures only
c. black and white pictures only
d. the sweep stability

77.04.07.24

199. The gray scale adjustment is made using the:

a. brightness control
b. tint control
c. drive controls
d. screen controls

200. In setting the gray scale, the service switch is put in the:

a. set-up position
b. service position
c. normal position
d. raster position

201. When the gray scale is properly adjusted, the three electron guns:

a. produce equal light output
b. are cut off
c. operate at their maximum output
d. have equal beam currents

202. After varying the brightness in checking the gray scale, what is looked for on the screen?

a. white dots or a crosshatch pattern
b. shadows
c. a color change
d. flesh tones

77.04.07.26

203. What happens to the picture of a color TV set when the service switch is turned on?

a. the screen goes blank
b. the picture turns gray
c. the screen turns red
d. the picture collapses to a white, line

77.04.07.27

204. What adjustment should be made if the screen changes color when the brightness is varied?

    a. the gray scale
    b. color purity
    c. dynamic convergence
    d. static convergence

77.04.07.28

205. Color purity is adjusted by using the:

    a. brightness control
    b. deflection yoke and purity magnets
    c. color-convergence board
    d. screen controls

77.04.07.29

206. What source should be used for reference in doing a dynamic convergence and a color set-up?

    a. a TV text book
    b. personal experience
    c. Sam's Photofact
    d. a convergence manual

77.04.08.01

207. What is the probable cause of the pattern displayed by figure #1 in the TV test pamphlet?

    a. not enough red
    b. an excessive amount of blue
    c. not enough color bars are displayed
    d. nothing, the pattern as displayed is normal

208. How many colors make up a keyed rainbow pattern?

    a. 15
    b. 7
    c. 10
    d. 3

209. Refer to figure #13 in the TV test pamphlet. What is wrong with the pattern depicted?

    a. too much blue
    b. no red
    c. out of phase
    d. no green

77.04.08.01 continued

210. Refer to figure #2 in the TV test pamphlet. What section of the TV should be checked when this pattern occurs?

a. sync-separator
b. horizontal oscillator
c. vertical oscillator
d. color oscillator

211. Refer to figure #14 in the TV test pamphlet. Which section of the TV should be checked when the screen appears like this?

a. color demodulator
b. color amp
c. video
d. picture tube

77.04.08.02

212. Refer to figure #12 in the TV test pamphlet. What is the problem with this TV picture?

a. too much green
b. no magenta
c. too much blue
d. no green

213. What is the problem with the TV picture as illustrated by figure #6 in the TV test pamphlet?

a. no green
b. too much red
c. no blue
d. no gray

214. Refer to figure #11 in the TV test pamphlet. What is wrong with this pattern?

a. nothing
b. too much blue
c. not enough green
d. no red

215. What is wrong with figure #5 in the TV test pamphlet?

a. too much blue
b. too much green
c. no red
d. out of phase

77.04.08.02 continued

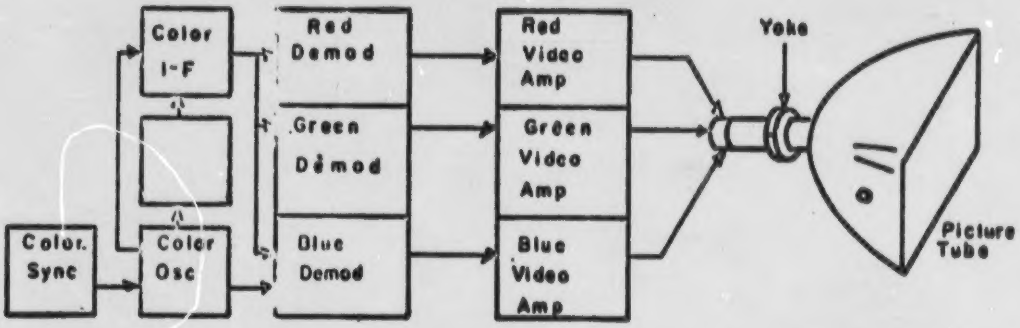
216. What is the probable cause of the pattern displayed by figure #7 in the TV test pamphlet?

a. too much blue
b. too much green
c. out of phase
d. no red

77.04.08.03

217. What chroma section is missing from the block diagram provided below?

a. MTSC amp
b. color killer
c. A.C.C.
d. burst amp


Color I-F
Red Demod
Red Video Amp
Yoke
Green Demod
Green Video Amp
Color Sync
Color Osc
Blue Demod
Blue Video Amp
Picture Tube

218. What section of a TV will cause a picture to appear like figure #4 in the TV test pamphlet?

a. sync separator
b. 3.58 MHZ oscillator
c. horizontal oscillator
d. A.G.C.

77.04.08.04

219. What section could [illegible] t [illegible] look like figure #8 in the TV test pamphlet?

a. first I.F. amp
b. A.C.C.
c. A.G.C.
d. video amp

77.04.08.04 continued

220. What is the predominant symptom of figure #6 in the TV test pamphlet?

a. excess red
b. excess green
c. no blue
d. no cyan

221. Referring to figure #3 in the TV test pamphlet, what is wrong with the test pattern depicted?

a. excess green
b. no blue
c. no magenta
d. excess red

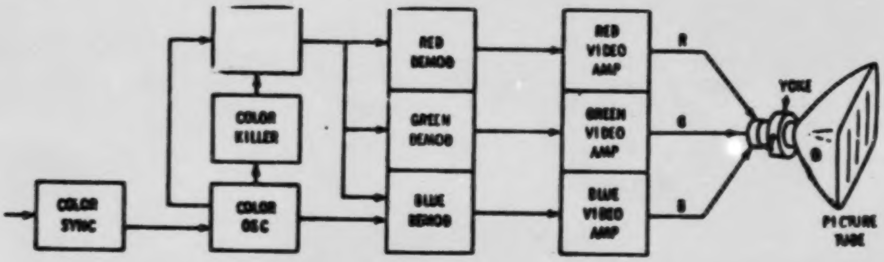
222. Refer to figure #15 in the TV test pamphlet. What section of a color TV set would display this picture if malfunctioning?

a. color
b. video output
c. A.G.C.
d. I.F. section

77.04.08.05

223. What section is missing from the block diagram below?

a. A.C.C.
b. NTCS amp
c. burst amp
d. delay line


RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
COLOR KILLER
COLOR SYNC
COLOR OSC
R
G
B
YOKE
PICTURE TUBE

224. The color sync signal received from a TV station is called:

a. video carrier information
b. chroma-sync pulse
c. color burst
d. sync pulse

77.04.08.05 continued

225. The four basic symptom categories for a color set are sound, video color and:

a. signal
b. sweep
c. raster
d. CRT

226. The color magenta in a test pattern is:

a. greenish-yellow
b. reddish-yellow
c. bluish-red
d. blue-green

77.04.08.06

227. To be able to use the color generator, a color TV must be on channel:

a. 2 or 3
b. 5 or 6
c. 3 or 4
d. 6 or 7

228. What section should be checked if a picture looks like figure #14 in the TV test pamphlet?

a. color amp
b. video
c. color demodulation
d. picture tube

77.04.08.07

229. What circuit in the chroma section will provide wrong colors to the screen by losing its sync?

a. burst amp
b. horizontal oscillator
c. demodulator
d. 3.58 MHZ oscillator

230. Which of the following adjustments have control over the amount of color displayed on the screen?

a. screen control
b. tint control
c. color intensity
d. drive controls

77.04.08.07

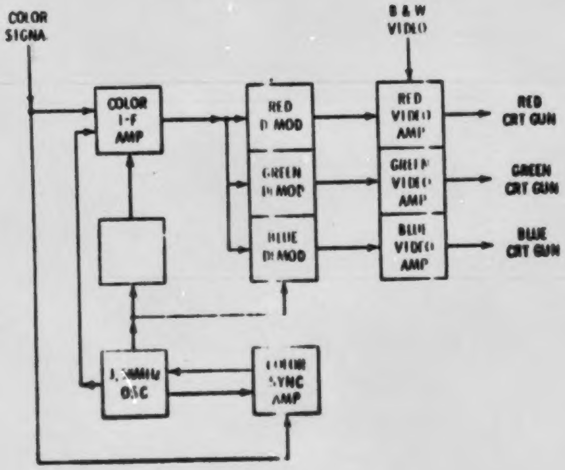
231. How many colors make up a NTCS color pattern?

a. 21
b. 10
c. 7
d. 3

77.04.08.08

232. What circuit is missing from this chroma section of a TV?

a. color killer
b. burst amp
c. demodulator
d. A.C.C.


COLOR SIGNA
B & W VIDEO
COLOR I-F AMP
RED D MOD
GREEN D MOD
BLUE D MOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
RED CRT GUN
GREEN CRT GUN
BLUE CRT GUN
3.58MHz OSC
COLOR SYNC AMP

77.04.08.09

233. What section of a color TV could cause a test pattern to look like figure #15 in the TV test pamphlet?

a. generator
b. picture tube
c. color killer
d. I.F. section

234. What is wrong with the test pattern depicted by figure #12 in the TV test pamphlet?

a. excessive blue
b. excessive red
c. no green
d. no yellow

77.04.08.10

235. What should be checked first when the symptom has no color?

a. burst amp
b. color killer control
c. A.C.C. control
d. demodulator

236. What keeps the 3.58 MHZ oscillator on frequency in the color section?

a. horizontal sync pulse
b. feedback
c. crystal
d. diode

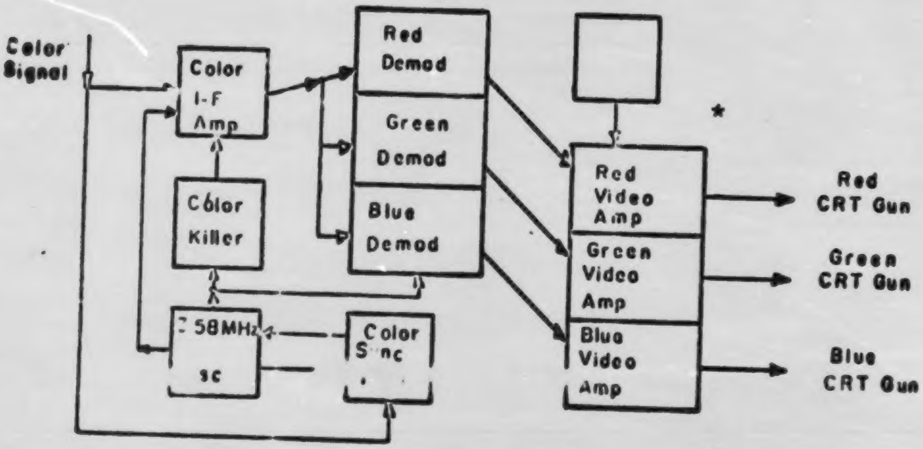
237. How can a crt be checked to see if it is the cause of one color loss?

a. picture tube checker
b. check the hi-voltage
c. view the screen
d. use a rainbow checker

77.04.08.11

238 What section is missing from this block diagram?

a. video
b. audio
c. horizontal sync pulse
d. A.G.C.


Color Signal
Color I-F Amp
Color Killer
3.58MHz Osc
Color Sync
Red Demod
Green Demod
Blue Demod
*
Red Video Amp
Green Video Amp
Blue Video Amp
Red CRT Gun
Green CRT Gun
Blue CRT Gun

77.04.08.11

239. The first step in checking a color TV with a no color problem is to:

a. check the tubes
b. check for sync pulse
c. check for color burst
d. check the demodulator

77.04.08.14

240. What type of pattern is depicted by figure #11 in the TV test pamphlet?

a. NTCS
b. split phase
c. keyed rainbow
d. B + K analyst

77.04.08.16

241. What is wrong with figure #13 in the TV test pamphlet?

a. no green
b. excessive blue
c. no red
d. too much yellow

77.04.08.17

242. If a television receiver has one excess color, what section may be checked with an oscilloscope to determine a malfunction?

a. ACC stage
b. color killer
c. color I.F. amp
d. 3.58 MHZ oscillator

243. If a color television is receiving a B & W picture and there is an excessive color, what section will cause this problem?

a. color killer
b. demodulator
c. sync amp
d. video amp

77.04.08.18

244. A raster with the [illegible] color over half of the screen is a symptom of:

a. bad crt
b. misadjusted screen control
c. incorrect purity
d. poor focus

77.04.08.18 continued

245. What controls the gain of the burst amp in the chroma section?

a. A.G.C.
b. A.C.C.
c. color intensity control
d. tint control

77.04.08.19

246. What will cause a pattern to look like figure #4 in the TV test pamphlet?

a. sync separator
b. horizontal oscillator
c. A.G.C.
d. A.C.C.

77.04.08.20

247. The output of the color I.F. goes where?

a. demodulator
b. color killer
c. 3.59 MHZ oscillator
d. color sync amp

248. What section will not give a loss of color sync in a color television?

a. color sync amp
b. reference oscillator
c. color I.F.
d. demodulator

249. Besides the color-sync amp causing loss of color sync, what other circuit might do so?

a. flyback transformer
b. phase lock
c. sync separator
d. gating

77.04.08.21

250. What will cause a pattern to look like figure #16 in the TV test pamphlet?

a. demodulator
b. color killer
c. A.G.C.
d. video amp

77.04.09.01

251. What do the letters "A.B.L." stand for in a TV set?

   a. automatic blue limiter
   b. automatic brightness limiter
   c. automated brilliance linearity
   d. automatic "berg" limiter

252. What device in a TV set picks up the electronic impulses from the remote control unit?

   a. speaker
   b. microphone
   c. service head
   d. transformer

253. What does "F.T.I." stand for in a TV set?

   a. fine tuning eye
   b. fine tuning indicator
   c. fine tuning interference
   d. field effect transistor

77.04.09.02

254. The output of the A.F.T. circuit goes to the:

   a. tuner oscillator of a TV set
   b. tuner mixer of a TV set
   c. third I.F. amp of a TV set
   d. first I.F. amp of a TV set

255. In a color set, the letters "D.A.C.C." stand for:

   a. delayed automatic color control
   b. delayed automatic gain control
   c. delayed advanced color circuit
   d. delayed automatic conditioning circuit

256. Which of the following devices is most commonly used in modern A.F.T. systems?

   a. transistor
   b. tube
   c. IC
   d. transformer

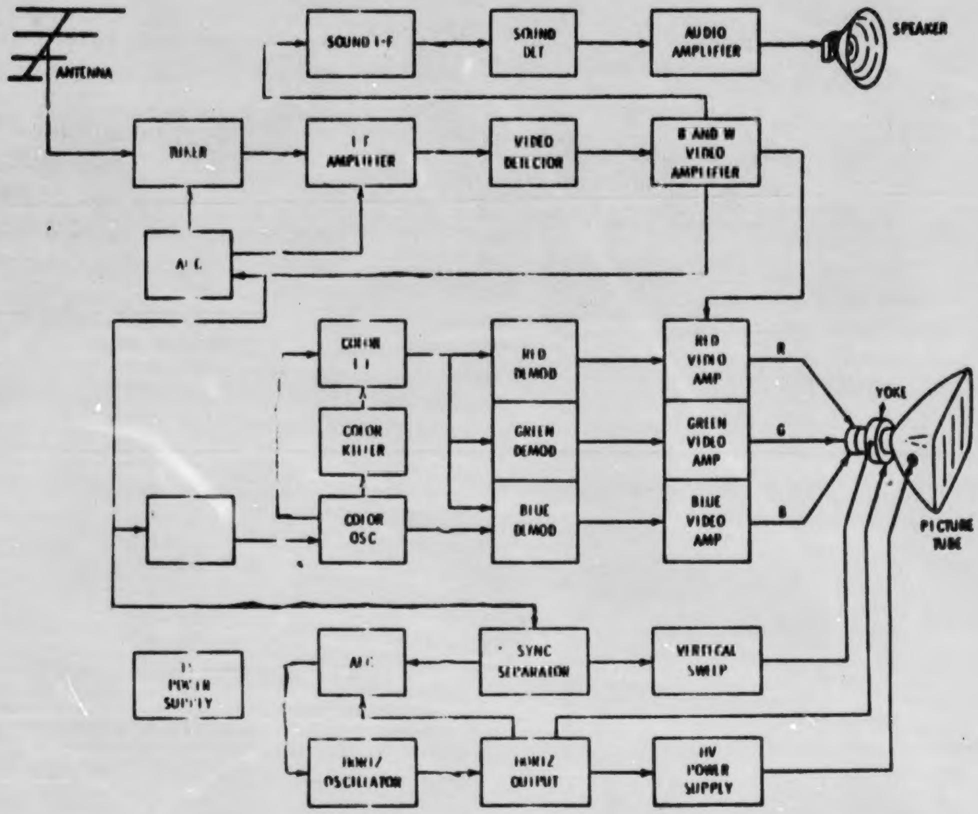
257. What is used in the electronic type of wireless remote control for sending signals?

   a. Oscillator circuit
   b. tuning fork
   c. clapper
   d. battery

77.04.09.04

258. What section is missing from the block diagram?

   a. color sync
   b. A.C.C.
   c. flyback
   d. A.G.C. amp


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
AGC
COLOR I-F
COLOR KILLER
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATION
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ____
Family Pay Number ____ Sex M F (Circle 1)

ANSWERS

77.04.01.01

1. A ____
2. A ____
3. B ____
4. C ____
5. A ____

02

6. C ____
7. C ____
8. D ____
9. D ____
10. D ____

03

11. D ____
12. C ____
13. A ____
14. B ____
15. D ____

04

16. D ____
17. B ____
18. C ____
19. C ____
20. B ____

77.04.02.01

21. B ____
22. C ____
23. B ____
24. A ____
25. C ____

02

26. B ____
27. A ____
28. B ____
29. B ____
30. C ____

03

31. B ____
32. B ____
33. C ____
34. D ____
35. B ____

04

36. B ____
37. B ____
38. A ____
39. D ____
40. C ____

05

41. A ____
42. D ____
43. C ____
44. C ____
45. C ____

06

46. C ____
47. B ____
48. A ____
49. C ____
50. A ____

07

51. B ____
52. C ____
53. A ____
54. D ____
55. C ____

08

56. C ____
57. C ____
58. C ____
59. B ____
60. B ____

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ______________________

ANSWERS

77.04.03.01
61. D ______
62. D ______
63. D ______
64. B ______
65. B ______

02
66. B ______
67. C ______
68. D ______
69. B ______
70. C ______

03
71. D ______
72. B ______
73. B __ __
74. D ______
75. B ______

04
76. B ______
77. B ___ ___
78. D ______
79. B ______
80. C ______

05
81. B ______
82. B ______
83. B ______
84. D ______
85. D ______

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86. C ______
87. D ______
88. D ______
89. A ______
90. B ______

07
91. D ______
92. A ______
93. D ______
94. C ______
95. D ______

08
96. C ______
97. A ______
98. C ______
99. B ______
100. D ______

09
101. A ______
102. C ______
103. A ______
104. D ______
105. A ______

10
106. C ______
107. C ______
108. B ______
109. D ______
110. A ______

11
111. B ______
112. C ______
113. C ______
114. B ______
115. B ______

12
116. B ______
117 B ______
118 B ______
119 B ______
120 D ______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name:

ANSWERS

13
121. D
122. A
123. A
124. D
125. C

14
126. B
127. B
128. C
129. C
130. A

15
131. C
132. A
133. D
134. A
135. D

16
136. B
137. D
138. C
139. C
140. B

77.04.04.01
141. D
142. B
143. D
144. C
145. C

02
146. A
147. D
148. A
149. D
150. B

03
151. C
152. D
153. C
154. C
155. C

04
156. D
157. A
158. B
159. B
160. D

05
161. D
162. C
163. C
164. A
165. A

06
166. C
167. C
168. C
169. B
170. B

07
171. B
172. A

08
173. C
174. B
175. C

09
176. A
177. B
178. D
179. A
180. C

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ______

ANSWERS

10
181. B ______
182. B ______
183. B ______
184. B ______
185. C ______
11
186. A ______
187. C ______
188. D ______
189. B ______
190. A ______
77.04.05.01
191. B ______
192. C ______
193. B __ __
194. A ______
195. B ______
02
196. C ______
197. A ______
198. A ______
199. D ______
200. A ______

03
201. B ______
202. C ______
203. A ______
204. B ______
205. B ______
04
206. C ______
207. C ______
208. A ______
209. A ______
210. C ______
05
211. A ______
212. D ______
213. D ______
214. D ______
215. B ______
06
216. B ______
217. A ______
218. D ______
219. D ______
220. B ______

07
221. D ______
222. B ______
223. D ______
224. A ______
225. B ______
08
226. A ______
227. C ______
228. B ______
229. C ______
09
230. A ______
10
231. D ______
232. C ______
233. A ______
11
234. B ______
235. A ______
12
236. D ______
237. D ______
238. C ______
239. A ______
240. B ______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ____________

ANSWERS

13
241. B ______
242. C ______
243. A ______
244. A ______
245. A ______

14
246. B ______
247. D ______
248. C ______
249. C ______
250. B ______

15
251. D ______
252. C ______
253. D ______
254. A ______
255. B ______

16
256. C ______
257. A ______
258. C ______
259. A ______
260. C ______

17
261. D ______
262. A ______
263. A ______
264. A ______
265. D ______

18
266. C ______
267. A ______
268. C ______
269. B ______
270. A ______

19
271. D ______
272. C ______
273. D ______
274. A ______
275. B ______

20
276. C ______
277. D ______
278. B ______
279. A ______
280. A ______

77.04.06.01
281. A ______
282. C ______
283. C ______
284. B ______
285. D ______

02
286. B ______
287. A ______
288. C ______

03
289. A ______
290. B ______

04
291. D ______
292. C ______
293. A ______
294. C ______
295. C ______

05
296. A ______
297. B ______
298. C ______
299. D ______
300. D ______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ______

ANSWERS

06
301.B ______
302.A ______
303.D ______
304.C ______
305.B ______
07
306.A ______
307.C ______
308.A ______
08
309.A ______
310.B ______
09
311.C ______
312.A ______
313.D ______
10
314.D ______
315.B ______
11
316.C ______
317.C ______
318.B ______
319.A ______
320.B ______

12
321. D______
322. C______
323. A______
13
324. A______
325. A______
14
326. A______
327. C______
15
328. C______
16
329. D______
330. B______
77.04.07.01
331. B______
332. B______
333. A______
334. D______
335. A______
02
336. D______
337. D______
338. D______
03
339. B______
340. B______

04
341. A______
342. D______
343. A______
344. A______
345. D______
05
346. B______
347. B______
348. B______
349. C______
350. B______
06
351. C______
352. B______
353. A______
354. A______
355. A______
07
356. A______
357. C______
358. B______
359. B______
360. B______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ______

ANSWERS

08
361. B ______
362. B ______
09
363. D ______
364. A ______
365. D ______
10
366. B ______
367. D ______
368. C ______
369. D ______
370. A ______
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371. B ______
372. C ______
373. C ______
374. D ______
375. C ______
12
376. B ______
377. D ______
13
378. B ______
379. A ______
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380. A ______

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381. C ______
382. C ______
383. D ______
384. A ______
385. D ______
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386. A ______
387. A ______
388. A ______
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389. C ______
390. B ______
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391. C ______
392. C ______
393. A ______
394. B ______
395. D ______
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396. A ______
397. C ______
398. A ______
399. A ______
400. A ______

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401. A ______
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402. A ______
403. D ______
404. B ______
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405. B ______
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406. D ______
407. C ______
408. A ______
409. A ______
410. C ______
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411. A ______
412. B ______
413. B ______
414. C ______
415. A ______
24
416. D ______
417. B ______
418. A ______
25
419. C ______
420. D ______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2=2
Name: ______________________

ANSWERS

26
421. D ______
422. D ______
423. B ______
424. D ______
425. B ______
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426. A ______
427. B ______
428. C ______
429. D ______
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431. B ______
432. C ______
433. A ______
434. C ______
435. B ______
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436. B ______
437. C ______
438. B ______
439. B ______
440. D ______

77.04.08.01
441. D ______
442. C ______
443. A ______
444. D ______
445. C ______
02
446. D ______
447. B ______
448. A ______
449. C ______
450. B ______
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451. B ______
452. A ______
453. C ______
454. D ______
455. A ______
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456. C ______
457. A ______
458. B ______
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480. C ______

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ____________

ANSWERS

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481. B____
482. C____
483. D____
484. A____
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487. C____
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527. C____
528. D____
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531. B____
532. A____
533. A____
534. B____
535. A____
77.04.09.01
536. B____
537. B____
538. B____
539. C____
540. C____

COURSE TEST ANSWER SHEET

Occupational Area: PRE & POST
File Code: 77.04.00.00 A2-2
Name: ______

ANSWERS

02 541. A ______
542. A ______
543. C ______
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03 546. C ______
547. C ______
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600. ______

EQUIPMENT

Projector, Super 8 Sound Film Model 60, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Television Training Kit, CRT & Enclosure KT-186, Color Training, Chassis, KT-185Y, Hickok Teaching Systems, Inc., Woburn, Massachusetts.

GENERAL INSTRUCTIONS:

This Unit consists of seven Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this Unit is as follows:

1. Read the first assigned Learning Activity Package (LAP).
2. Begin and complete the first assigned LAP.
3. Take and score the LAP test.
4. Turn in the LAP test answer sheet.
5. Determine the reason for any missed items on the LAP test.
6. Proceed to and complete the next assigned LAP in the unit.
7. Complete all required LAPs for the unit by following steps 3 through 6.
8. Take the unit tests as described in the Unit LEG "Evaluation Procedures".
9. Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Introduction to Television
.02 The Television Set Block Diagrams
.03 Block Diagrams of B/W Set
.04 Radio Waves
.05 Antenna Functions
.06 Television Antennas
.07 Television Controls

EVALUATION PROCEDURE:

When pretesting and post testing:

1. The student takes the unit multiple-choice test.
2. Successful completion is 4 out of 5 items for each LAP part of the test.

FOLLOW THROUGH:

After you have read this Unit guide, you are to read the first assigned LAP. You will be expected to use the knowledge and skills required in the prerequisite courses in doing these activities.

Student: ____________________ File Code: 77.04.01.00.A2-2

Date: ____________________ Date Published: 9/24/74

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

UNIT PRETEST: INTRODUCTION TO/AND BLOCK DIAGRAMS OF TELEVISION

77.04.01.01.

1. How many picture elements might you find in one TV picture?

   a. 315,000
   b. 100,000
   c. 50,000
   d. 150,000

2. The signal which coordinates the color information with the video information is called:

   a. scan liner.
   b. frames.
   c. video.
   d. color burst.

3. How many fields are reproduced per second by a set when scanning a picture?

   a. 2
   b. 525
   c. 1
   d. 262½

4. What determines the amount of red, green and blue signal transmitted from the station?

   a. TV set.
   b. color camera.
   c. color burst.
   d. signal.

5. What are the signal characteristics of the audio in a TV set?

   a. FM stereo.
   b. shortwave.
   c. AM.
   d. FM.

77.04.01.02

6. Which signal carries the sound?

   a. video signal.
   b. sound I.F.
   c. sync signal.
   d. yoke.

7. What provides D.C. voltage to your set in order to operate?

   a. fuse.
   b. power supply.
   c. circuit breaker.
   d. battery.

8. Which part of the tuner amplifies the signal?

   a. I.F. section.
   b. video section.
   c. mixer-oscillator section.
   d. R.F. section.

9. What channels does the UHF band cover on a TV?

   a. 1-2.
   b. 14-84.
   c. 2-13.
   d. 13-14.

10. In which circuit is the video detector located?

    a. sync circuit.
    b. often the round circuit.
    c. video circuit.
    d. tunes.

77.04.01.03

11. The vertical sync signal regulates the rate at which the picture is:

    a. scanned.
    b. tuned.
    c. detected.
    d. regulated.

12. What three sections are coupled to the A.G.C.- the tuner, the I.F. section and:

    a. video amp.
    b. sound detector.
    c. sound I.F.
    d. sync.

77.04.01.03 cont.

13. What insures that the horizontal scan rate is correct?

    a. sync pulse.
    b. A.A.C.
    c. A.F.C.
    d. I.F. amp.

14. The AGC signal goes to the I.F. amp and the:

    a. tuner.
    b. yoke.
    c. sound.
    d. video.

15. Which section is the vertical output signal coupled to?

    a. sync separator.
    b. horizontal A.F.C.
    c. yoke.
    d. horizontal output.

77.04.01.04

16. Television repairmen use block diagrams to help them trace the flow of __________ through a receiver.

    a. current.
    b. power.
    c. voltage.
    d. signals.

17. If you had no audio in a TV receiver, but the tuner, I.F. and video circuits checked allright, what section would you trouble shoot?

    a. sync.
    b. tuner and antenna.
    c. power supply.
    d. audio.

18. Where is the on-off switch in the TV circuit?

    a. tuner.
    b. hi-voltage supply.
    c. low voltage power supply.
    d. audio section.

19. If the horizontal oscillator quits working, would you have your picture?

    a. No.
    b. sometimes.
    c. yes.
    d. only every other frame.

20. Where is the volume control in the TV circuit?

    a. audio section.
    b. sync section.
    c. tuner.
    d. video section.

UNIT PRETEST ANSWER KEY: INTRODUCTION TO/AND BLOCK DIAGRAMS OF TELEVISION

LAP .01	1.	D
	2.	D
	3.	A
	4.	B
	5.	D
LAP .02	6.	B
	7.	B
	8.	D
	9.	B
	10.	C
LAP .03	11.	A
	12.	A
	13.	C
	14.	A
	15.	C
LAP .04	16.	D
	17.	D
	18.	C
	19.	A
	20.	A

File Code: 77.04.01.01.A2-0

Date Published: 12/14/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Introduction to Television

OBJECTIVE:

Name the signal components and explain the purpose for each component.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Television Symptom Diagnosis: An Entry into T.V. Servicing, Tinnell.
Film Loop #00 Television Symptom Diagnosis - Introduction.

Projector

PRECEDURE:

1. Read Chapter I in the above resource.
2. Answer the review questions for the chapter.
3. Check answers with key.
4. View Film Loop #00.
5. Record your comments on the back of this LAP.
6. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.01.01.A2-2

Date: ______________________ Date Published: 10/27/77

LAP TEST: INTRODUCTION TO TELEVISION

77.04.01.01

1. The three basic colors used in color TV are red, blue and:

   a. gray.
   b. yellow.
   c. green.
   d. white.

2. How many picture elements are in a line?

   a. 262½
   b. 400
   c. 525
   d. 60

3. What is the principal advantage of using interlace scanning in the TV system?

   a. better color.
   b. better focus.
   c. reduced flickering.
   d. better resolution.

4. If a TV is operating and no picture is present but there is scanning, the white scanning is called:

   a. video.
   b. liner.
   c. raster.
   d. audio.

5. The signal which coordinates the color information with the video information is called:

   a. video.
   b. scan lines.
   c. frames.
   d. color burst.

6. The brightness signal, along with the color signal, is called :

   a. video.
   b. synchronizing.
   c. sound.
   d. color.

7. What are the impulses called that are broadcast with the picture element information?

   a. synchronizing signals.
   b. radio signals.
   c. locking signals.
   d. color signals.

8. How many picture elements might you find in one TV picture?

   a. 100,000
   b. 75,000
   c. 315,000
   d. 150,000

9. How many fields are reproduced per second by a set when scanning a picture?

   a. 2
   b. 525
   c. 1
   d. 262½

10. How many complete pictures are broadcast in one second?

   a. 60
   b. 240
   c. 30
   d. 120

LAP TEST ANSWER KEY: INTRODUCTION TO TELEVISION

1. C
2. B
3. C
4. C
5. D
6. A
7. A
8. D
9. A
10. C

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File Code: 77.04.01.02.A2-0

Date Published: 12/14/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: The Television Set Block Diagrams

OBJECTIVE:

Explain the function of each section in a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 2 in the above resource.
2. Answers the review questions for Chapter 2.

   NOTE: Check with the instructor if you have any questions or problems relating to this LAP.
3. Check answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ________________ File Code: 77.04.01.02.A2-2

Date: ________________ Date Published: 10/27/77

Mountain-Plains Education &
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LAP TEST: THE TELEVISION SET BLOCK DIAGRAMS

1. The signal strength is automatically controlled by which function in the tuner?

   a. the I.F.
   b. the fine tuning.
   c. the AGC.
   d. the antenna.

2. In which section is the contrast control located?

   a. sync section.
   b. video section.
   c. round section.
   d. tuner.

3. In which circuit are the height and linearity controls?

   a. sound.
   b. horizontal oscillator.
   c. vertical output.
   d. horizontal output.

4. The signal goes from the video I.F. section to the:

   a. yoke.
   b. sound detector.
   c. video detector.
   d. tuner.

5. What separates the sound information from your sound carrier?

   a. the video detector.
   b. the detector.
   c. the sound I.F.
   d. the yoke.

6. In which circuit is the video detector located?

   a. the tuning circuit.
   b. the sync circuit.
   c. the video circuit.
   d. often in the round circuit.

7. Which part of the tuner amplifies the signal?

   a. the mixer-oscillator section.
   b. the R.F. section.
   c. the video section.
   d. the I.F. section.

8. What do you call the signal which contains both picture information and synchronizing pulses?

   a. the I.F. signal.
   b. the sync pulse.
   c. the sound I.F.
   d. the composite video.

9. What frequency does the tuner convert the incoming signals to?

   a. the IF band.
   b. the audio.
   c. the video band.
   d. the AGC band.

10. What provides D.C. voltage to your set in order to operate?

   a. the circuit breaker.
   b. the battery.
   c. the power supply.
   d. the fuse.

LAP TEST ANSWER KEY: THE TELEVISION SET BLOCK DIAGRAMS

1. C
2. B
3. C
4. C
5. B
6. C
7. B
8. D
9. A
10. C

File Code: 77.04.01.03.A2-0

Date Published: 12/14/76

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Block Diagrams of B/W Set

OBJECTIVE:

Given a blank television block diagram, label each of the sections in the diagram.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 1 in the Student Response Manual.
2. Complete the Practice Exercises for Lesson #1
3. Check answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson B. Vetter

Student: ____________________ File Code: 77.04.01.03.A2-2

Date: ____________________ Date Published: 9/25/74

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LAP TEST: BLOCK DIAGRAM OF B/W SET

1. The current coming out of a TV power supply is:
   - a. high D.C.
   - b. high A.C.
   - c. both high A.C. and D.C.
   - d. low A.C.

2. The video amp handles four signals. They are the sync, AGC, video, and:
   - a. sound signal.
   - b. A.M. signal.
   - c. A.F.C. signal.
   - d. R.F. signal.

3. Which section produces signal which scans the picture horizontally?
   - a. the video section.
   - b. the sync section.
   - c. the vertical oscillator.
   - d. the horizontal oscillator.

4. Which part of the TV set would the antenna be connected with?
   - a. the sync section.
   - b. the tuner.
   - c. the yoke.
   - d. the I.F. section.

5. The speaker is connected to what part of the audio section?
   - a. the volume control.
   - b. the sound I.F. section.
   - c. the amplifier.
   - d. the detector.

6. The horizontal and vertical sync signals are separated from each other in which circuit?
   - a. the video I.F.
   - b. the sync separator circuit.
   - c. the color circuit.
   - d. the tuner.

7. The high-voltage power supply provides the power to operate the:

   a. yoke.
   b. sound.
   c. tuner.
   d. picture tube.

8. Which section is the vertical output signal coupled to?

   a. the yoke.
   b. the horizontal output.
   c. the sync separator.
   d. the horizontal A.F.C.

9. What parts of a TV set does the power supply, supply current to?

   a. all sections.
   b. tune only.
   c. only the sweep section.
   d. the high voltage section.

10. What would happen if you lost the hi-voltage supply?

   a. no raster.
   b. no sync.
   c. no sound.
   d. no tuning ability.

LAP TEST ANSWER KEY: BLOCK DIAGRAM OF B/W SET

1. A
2. A
3. D
4. B
5. C
6. B
7. D
8. A
9. A
10. A

Student: ______________________ **File Code:** 77.04.01.04. & .05

Date: ______________________ **Date Published:** 11/29/77

Family Education Program

LAP TEST: RADIO WAVES/ANTENNA FUNCTIONS

1. What type of energy is contained in radio waves?

   a. electrostatic.
   b. kinetic.
   c. electromagnetic.
   d. magnetic.

2. In what frequency range are signals reflected back by the ionosphere?

   a. 30-300 Mhz
   b. 3-30 Mhz
   c. 3-30 Khz
   d. 30-300 Khz

3. What is the speed of a radio wave in free space?

   a. 300,000,000 Mps
   b. 30,000,000 Mps
   c. 300,000,000,000 Mps
   d. 30,000 Mps

4. Who assigns the operating frequencies of U.S. broadcast stations?

   a. ICC
   b. ICS
   c. FAA
   d. FCC

5. What is another name of the 27 Mhz, CB band?

   a. 14 meter band.
   b. 75 meter band.
   c. 75 meter band.
   d. 11 meter band.

6. Why is there a large gap of frequencies between channel 6 and 7 in the television band?

   a. for CB.
   b. for Fm.
   c. for ham.
   d. for police.

7. In a television antenna, what effect does frequency have on the elements length?

    a. nothing, the element can't change the frequency.
    b. the higher the frequency, the shorter the element.
    c. the lower the frequency, the shorter the element.
    d. above and below resonant.

8. What is the imput impedance of a television set?

    a. cannot be calculated.
    b. 300 ohms.
    c. 75 ohms.
    d. 75 or 100 ohms.

9. What is the main advantage of broad band antennas?

    a. more channel coverage.
    b. less channel coverage.
    d. polydirectional reception.
    d. finer low channel reception.

10. Why must there be a good impedance match between the antenna and the television set?

    a. to reduce non-resonant.
    b. not necessary.
    c. to keep out CB interference.
    d. reduce ghosts.

LAP TEST ANSWER KEY: RADIO WAVES/ANTENNA FUNCTIONS

1. C
2. B
3. A
4. D
5. D
6. B
7. B
8. B
9. A
10. D

Student: ____________________ File Code: 77.04.01.04. & .05.A1-2

Date: ____________________ Date Published: 10/27/77

Mountain-Plains Education &
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UNIT LAP TEST: RADIO WAVES/ANTENNA FUNCTIONS

1. What type of energy is contained in radio waves?

   a. Electromagnetic.
   b. Electrostatic.
   c. Kinetic.
   d. Magnetic.

2. What type of operation is best suited for good singal reception?

   a. Line of sight.
   b. Reflected.
   c. Dishpan.
   d. Parabolic.

3. In what frequency range are signals reflected back by the ionosphere?

   a. 3-30 Mhz
   b. 30-300 Mhz
   c. 3-30 Khz
   d. 30-300 Khz

4. Television signals are what type of signal?

   a. Line of sight.
   b. Reflected.
   c. Relayed.
   d. RF.

5. What is the speed of a radio wave in free space?

   a. 300,000,000 mps
   b. 30,000,000 mps
   c. 300,000,000,000 mps
   d. 30,000 mps

6. What is the frequency range of AM broadcast stations in the U.S.?

   a. 53' · 05 Khz
   b. 53 -1605 Mhz
   c. 550-1600 Mhz
   d. 550-1600 Khz

7. Who assigns the operating frequencies of U.S. broadcast stations?

   a. FCC
   b. FAA
   c. ICS
   d. ICC

8. What is another name for the 27Mhz, CB band?

   a. 11 meter band.
   b. 27 meter band.
   c. 75 meter band.
   d. 14 meter band.

9. In TV broadcasting, how much higher in frequency is the audio subcarrier from the picture carrier?

   a. 4.5 Mhz
   b. 455 Khz
   c. 4.5 Khz
   d. 3.58 Mhz

10. There is a large gap of frequencies between channel 6 and 7 in the television band which includes:

    a. for FM
    b. for CB
    c. for ham
    d. for police

11. What is the main advantage of broad band antennas?

    a. more channel coverage.
    b. less channel coverage.
    c. poly-directional reception.
    d. finer reception.

12. In a television antenna, what relationship does frequency have to the elements length?

    a. the higher the frequency, the shorter the element.
    b. the lower the frequency, the shorter the element.
    c. nothing, the element can be any length.
    d. above and below resonant length.

13. What are the two frequency bands that television is catagorized?

    a. UHF/VHF
    b. VHF/LFH
    c. UHF/LHF
    d. VHF/EHF

14. What is the input impedance of a television set?

    a. 300 ohms
    b. 75 ohms
    c. 75 or 100 ohms
    d. Cannot be calculated

15. One reason why there should be a good impedance match between the antenna and the television set?

    a. reduce ghosts.
    b. to reduce non-resonant.
    c. not necessary.
    d. to keep out CB interference.

LAP TEST ANSWER KEY: RADIO WAVES/ANTENNA FUNCTIONS

1. A
2. A
3. A
4. A
5. A
6. A
7. A
8. A
9. A
10. A
11. A
12. A
13. A
14. A
15. A

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File Code: 77.04.01.06.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Television Antennas

OBJECTIVE:

Identify various types and characteristics of television antennas.

EVALUATION PROCEDURE:

RESOURCES:

Introduction to Antennas, by Dezettel

PROCEDURE:

Steps

1. Read Chapter 3 titled "TV Antennas" in the above resource.
2. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.01.06.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: TELEVISION ANTENNAS

1. How much higher is the frequency in the high band VHF as compared to the low band?

   a. 1½ times.
   b. 4 times.
   c. ½ times.
   d. 3 times.

2. What is the band width of a color television as compared to a black and white?

   a. 455 Khz
   b. 3.58 Mhz
   c. 6 Mhz
   d. 4.5 Mhz

3. Sensitivity of an antenna is categorized into how many areas?

   a. 7
   b. 5
   c. 4
   d. 6

4. Because of decreased efficiency in the UHF band, the distance indicated for UHF is usually about how much less as compared to VHF?

   a. 25%
   b. 30%
   c. 40%
   d. 15%

5. What is the main purpose of an antenna rotor?

   a. tune in color.
   b. it is not used in a television system.
   c. turn the antenna.
   d. change the impedance.

6. What type of lead in is best for color reception?

   a. transformer.
   b. coaxial cable.
   c. 300 ohm twin lead.
   d. Mylar lead.

7. What is the impedance of coaxial cable used in television reception?

   a. 300 ohm
   b. 75/100 ohm
   c. 75/300 ohm
   d. 75 ohm

8. To what length are the antenna elements cut?

   a. ½ wave length.
   b. ¼ wave length.
   c. 5/8 wave length.
   d. full length.

9. In respect to the antenna, where should the antenna rotor be mounted?

   a. above it.
   b. below it.
   c. on the roof.
   d. next to the television.

10. What produces a ghost or secondary image on a television screen?

   a. lack of a rotor.
   b. using the wrong lead-in.
   c. secondary signal.
   d. wrong antenna.

LAP TEST ANSWER KEY: TELEVISION ANTENNAS

1. D
2. C
3. B
4. A
5. C
6. B
7. D
8. A
9. B
10. C

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Date Published: 12/15/76

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Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Television Controls

OBJECTIVE:

Identify the television section that is affected by each black and white television control.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES

Black and White Television Diagnosis Sheets
Television Symptom Diagnosis: Student Response Manual. Tinnell
Film Loop #01 Block Diagram of a B/W Television Receiver.

Projector
Television training kit

PROCEDURE:

1. Complete the questions and steps in the laboratory practices section on pages 11 through 13 in the response manual.
2. View Film Loop #01 and complete the film loop activities.
3. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.01.07.A2-2

Date: ______________________ Date Published: 10/28/77

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LAP TEST: TELEVISION CONTROLS

1. In which TV section is the contrast control?

   a. the video detector.
   b. the video amp.
   c. the video I.F.
   d. the hi-voltage section.

2. Where is the on-off switch in the TV circuit?

   a. in the audio section.
   b. in the low voltage power supply.
   c. in the hi-voltage supply.
   d. in the tuner.

3. The number of horizontal lines scanned in 1/60 second are:

   a. 262.5
   b. 15,750
   c. 202.5
   d. 63.5

4. In the block diagram, which section is #10? (See diagram 1)

   a. the horizontal oscillator.
   b. the sync section.
   c. the AFC.
   d. the vertical oscillator.

5. Which section of a TV would affect every section in it?

   a. the power supply.
   b. the I.F. amp.
   c. the tuner.
   d. the sync separator.

6. In which section is the brightness control located?

   a. in vertical output.
   b. in the video.
   c. in the I.F. amp.
   d. in the tune section.

7. If you had no audio in a TV receiver, but the tuner, I.F. and video circuits checked all right, what section would you trouble shoot?

   a. power supply.
   b. audio.
   c. sync.
   d. tuner and antenna.

8. Television repairmen use block diagrams to help them trace the flow of __________ through a receiver.

   a. signals.
   b. power.
   c. voltage.
   d. current.

9. Where is the volume control in the TV circuit?

   a. sync section.
   b. video section.
   c. tuner.
   d. audio section.

10. If the horizontal oscillator quits working, would you have your picture?

    a. only every other frame.
    b. no.
    c. yes.
    d. sometimes.

LAP TEST ANSWER KEY: TELEVISION CONTROLS

1. B
2. B
3. A
4. C
5. A
6. B
7. B
8. A
9. D
10. B

Student: ______________________ File Code: 77.04.01.00.B2-2

Date: ______________________ Date Published: 7/29/75

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UNIT POST TEST: INTRODUCTION TO/AND BLOCK DIAGRAMS OF TELEVISION

77.04.01.01

1. What is the principal advantage of using interlace scanning in the TV system?

   a. better resolution.
   b. better focus.
   c. better color.
   d. reduced flickering.

2. Which signal tells the receiver to start at the top when scanning a frame?

   a. audio pulse
   b. color pulse
   c. horizontal sync pulse
   d. vertical sync pulse

3. How many complete pictures are broadcast in one second?

   a. 60
   b. 30
   c. 120
   d. 240

4. What are the impulses called that are broadcast with the picture element information?

   a. synchronizing signals.
   b. locking signals.
   c. radio signals.
   d. color signals.

5. The ability of a picture to show small details clearly is called:

   a. sno
   b. focus.
   c. fine tuning.
   d. resolution.

77.04.01.02

6. **The signal strength in the tuner is automatically controlled by what function?**

   a. antenna.
   b. fine tuning.
   c. I.F.
   d. A.G.C.

7. Which circuit does the volume control sit?

   a. audio amp.
   b. audio detector.
   c. speaker.
   d. sound I.F.

8. What separates the sound information from your **sound** carrier?

   a. detector.
   b. yoke
   c. sound I.F.
   d. video detector.

9. Where does the signal go from the I.F. section?

   a. tuner.
   b. yoke.
   c. video detector.
   d. sound detector.

10. Which section feeds the hi-voltage power supply?

   a. horizontal output.
   b. sound.
   c. vertical output.
   d. sync system.

77.04.01.03

11. The current coming out of a TV power supply is:

   a. both high AC and DC.
   b. low A.C.
   c. high D.C.
   d. high A.C.

12. The speaker is connected to what part of the audio section?

    a. amplifier.
    b. volume control.
    c. detector.
    d. the sound I.F. section.

13. What parts of a TV set does the power supply, supply current to?

    a. all sections.
    b. tune only.
    c. the high voltage section.
    d. only the sweep section.

14. What would happen if you lost the hi-voltage supply?

    a. no raster.
    b. no tuning ability.
    c. no sound.
    d. no sync.

15. The horizontal output goes to the AFC, yoke and which of the following circuits.

    a. vidio.
    b. tuner.
    c. hi-voltage supply.
    d. color.

77.04.01.04

16. In which TV section is the contrast control?

    a. video I.F.
    b. video detector.
    c. video amp.
    d. hi-voltage section.

17. In the block diagram, which section is #10? (See diagram 1)

    a. horizontal oscillator.
    b. sync section.
    c. AFC.
    d. vertical oscillator.

18. To make a TV signal stronger is to do what to it?

    a. detect.
    b. shorten.
    c. amplify.
    d. rectify.

19. Which section is the brightener section in a TV?

    a. tuning section.
    b. video section.
    c. I.F. amp.
    d. vertical output.

20. How many times per second is the picture scanned left to right?

    a. 15,750
    b. 120,000
    c. 60,000
    d. 78,750

UNIT POST TEST ANSWER KEY: INTRODUCTION TO/AND BLOCK DIAGRAMS OF TELEVISION

LAP .01

1. D
2. D
3. A
4. A
5. D

LAP .02

6. D
7. A
8. A
9. C
10. A

LAP .03

11. C
12. A
13. A
14. A
15. C

LAP .04

16. C
17. C
18. C
19. B
20. A

File Code: 77.04.02.00.A2-1

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: TELEVISION AUDIO SECTION TROUBLES

RATIONALE:

After a serviceperson identifies the audio section of the television receiver that is not functioning properly, the individual stage causing the problem is then isolated. To do this requires knowledge about the normal operation of these stages and how abnormal operation is identified and corrected. After successfully finishing the activities in this Unit, you will be able to identify and correct abnormal operation of the stages in the audio and sound intermediate frequency sections of a tube type or solid state television receiver.

PREREQUISITES:

Unit .01: Introduction to/and Block Diagrams of Television.

OBJECTIVES:

Recognize symptoms of trouble; diagnose difficulties; make necessary adjustments, remove, repair, and replace components for the audio and intermediate-frequency sound section of a transistor or tube type television receiver using proper tools and equipment.

RESOURCES:

Printed Materials

Television Symptom Diagnosis: An Entry Into TV Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.

Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.

Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.

Black and White Television Diagnosis Sheets.

Instruction Manual for 1077 Television Analyst, B and K Division of Dynascan Corporation, 1968.

Transistor TV Training Course. Robert Middleton, Howard W. Sams and Company, Inc., 1973.

Photofact Television Course. Howard W. Sams Editorial Staff. Howard W. Sams and Company, Inc., 1975.

Instruction Manual for B and K Model 162 Transistor/FET Checker. Dynascan Corporation, 1973.

Semi-conductor Replacement Guide.

Audio/Visual

Super 8 Sound Films:

Television Symptom Diagnosis Series TSD-133. (Film Loops #02 and #03), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

RESOURCES: (continued)

Equipment

Desoldering iron.
Desoldering tools.
Iron, soldering.
Kit, Service Master 99SM or equivalent, Xcelite 99SM Kit, Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Meter, volt-ohm.
Oscilloscope.
Projector, Super 8 Sound Film, Model 60, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Television Analyst, B and K Model 1077B, Dynascan Corporation 1801 West Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT and Enclosure KT-186, Color Training Chassis, KT0185Y, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Tools, soldering.
Vacuum tube checker
B and K Model 162 Transistor/FET Checker.
0-10VDC Variable Power Supply
0-18VDC Variable Power Supply
0-12VDC Variable Power Supply
Microammeter
Milliammeter
6.3VAC Power Supply
Audio Generator
Resistor 47K, 1W
Resistor 1K, 1W
Resistor 47 ohm, 1W
Transistor PNP
Diode 500ma
Transistor NPN
Capacitor 10MF, 25V
Resistor 100K 1W
Potentiometer 100K,½W
Resistor 470 ohm, 1W
Resistor 270 ohm, 1W
Resistor 10K, 1W
Capacitor 50MF
Potentiometer 1K, 2W
Resistor 3.9K, 1W
Resistor 3.9K, 1W
Diode, 25ma, 50PIV
Capacitor 50 mf
Capacitor 10 mf
Switch SPST

GENERAL INSTRUCTIONS:

This Unit consists of ten Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this Unit is as follows:

1. Read the first assigned Learning Activity Package (LAP).
2. Begin and complete the first assigned LAP.
3. Take and score the LAP test.
4. Turn in the LAP test answer sheet.
5. Determine the reason for any missed items on the LAP test.
6. Proceed to and complete the next assigned LAP in the unit.
7. Complete all required LAPs for the unit by following steps 3 through 6.
8. Take the unit tests as described in the Unit LEG "Evaluation Procedures".
9. Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Audio Section Failures
.02 Transistor Applications
.03 Black and White Trouble
.04 Sound, Video and Raster Symptoms
.05 The Sound I-F Section
.06 Sound Troubles
.07 Isolating Sound Troubles
.08 Solid State Audio Section
.09 Transistor/FET Tester
.10 Diagnosing Sound Troubles

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After you read this Unit guide, read the LAP for the first assigned performance activity. Use the knowledge and skills that you have acquired in the prerequisites for this Unit.

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File Code: 77.04.02.01.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Audio Section Failures

OBJECTIVE:

Describe typical symptoms or conditions related to audio section failures.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into TV Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 3 in the above resource.
2. Answer the review questions for the chapter.
3. Check answers with the key.
4. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ File Code: 77.04.02.01.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: AUDIO SECTION FAILURES

1. What stage of a TV audio section is applied directly across the volume control?

   a. detector.
   b. collector of the power amplifier.
   c. sound I.F. stage.
   d. driver amplifier.

2. If you listen to your speaker in a TV set, and there is no audio or no soft hum, which part of the audio circuit would you trouble shoot?

   a. detector circuit.
   b. power supply.
   c. audio amplifier.
   d. sound I.F. circuit.

3. The three main parts of a speaker are the terminals, the magnet and the:

   a. spring.
   b. volume control.
   c. voice coil.
   d. transformer.

4. On the sound I.F. tube V4, if the plate voltage reading was 0 v and the suppressor grid reading was 80 v, what would this indicate? (See diagram 2)

   a. R35, 12K resistor is open.
   b. open primary winding in coil.
   c. bad tube.
   d. shorted capacitor in primary winding.

5. In what stage of an audio circuit in a TV is the volume control located?

   a. detector stage.
   b. I.F. stage.
   c. audio amplifier stage.
   d. speaker.

6. What kind of circuit is in a power amplifier in an audio circuit of a TV when it is using 2 transistor to operate the speaker?

   a. speaker.
   b. push-push.
   c. push-pull.
   d. pull-pull.

7. Referring to L12 of the audio section, what is the symptom if C27 shorts? (See diagram 3)

   a. good audio.
   b. transformer would burn up.
   c. no sound at all.
   d. no audio, but have a low hum.

8. In the video section, what would happen if A9 of the transformer L8 opened up? (See diagram 2)

   a. lose audio.
   b. lose video.
   c. poor sound.
   d. poor video.

9. In a TV audio section, would a bad coupling capacitor distort the sound?

   a. yes.
   b. only the A.C. part.
   c. just in the high volume side of the volume control.
   d. no.

10. If the transformer T4 in the audio section shorted in the secondary windings, would you have any audio? (See diagram 2)

   a. yes, but only a low whistle.
   b. yes.
   c. no.
   d. yes, but only noise.

LAP TEST ANSWER KEY: AUDIO SECTION FAILURES

1. A
2. C
3. C
4. B
5. C
6. C
7. D
8. A
9. A
10. C

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Transistor Applications

OBJECTIVE:

Identify various basic transistor types. Identify transistor amplification characteristics.

EVALUATION PROCEDURE:

RESOURCES:

Transistor TV Training Course by Middleton
B and K Model 162 Transistor/FET Checker
0-10VDC Variable Power Supply
0-18VDC Variable Power Supply
0-12VDC Variable Power Supply
Microammeter
Milliammeter
6.3 VAC Power Supply
Audio Generator
Resistor 47K 1W
Resistor 47 ohm 1W
Resistor 1K, 1W
Transistor PNP
Diode 500ma
Capacitor 10mf
Transistor NPN
Switch SPST
Capacitor 10mf, 25V
Resistor 100K, 1W
Potentiometer, 100K ½W
Resistor 470 ohm 1W
Resistor 270 ohm 1W
Resistor 10K 1W
Capacitor 50mf
Potentiometer 1K, 2W
Resistor 3.9K, 1W
Diode 25 ma, 50PIV
Capacitor 50mf

PROCEDURE:

1. Read Chapter 1, "Transistor Applications in Television Receivers", in the above resource.
Answer the review questions at the end of the chapter.
3. Check your answer with the answer key.
4. Complete experiments 5-1, 6-1, 7-1, 8-1, 9-1, and 12-1 attached to this LAP. Have an instructor assist and verify your work.
5. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.02.02. A2-2

Date: ______________________ **Date Published:** 11/29/77

Family Education Program

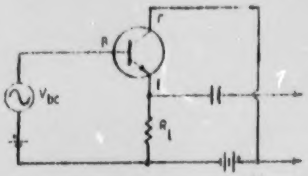
LAP TEST: TRANSISTOR APPLICATIONS

1. What is the efficiency factor of a typical transistor amplifier as compared to a tube tupe amplifier?

   a. 25%
   b. 10%
   c. 75%
   d. 90%

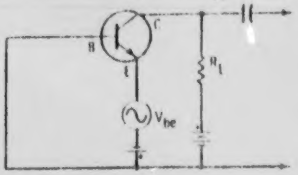
2. In what year was the first transistor television receiver demonstrated?

   a. 1959
   b. 1963
   c. 1952
   d. 1948



3. What type of circuit is illustrated?

   a. common emitter.
   b. power amplifier.
   c. common collector.
   d. common base.



4. What type of transistor circuit is illustrated?

   a. common emitter.
   b. common collector.
   c. emitter follower.
   d. common base.

5. The voltage gain of an amplifier is the ratio of a ac output voltage to what?

   a. input resistance.
   b. input voltage.
   c. output phase.
   d. input phase.

6. The ratio of collector-current increase to emitter current increase is what value of a transistor?

   a. alpha.
   b. beta.
   c. mu.
   d. leakage.

7. The ratio of collector-current increase to base-current increase in a transistor is called?

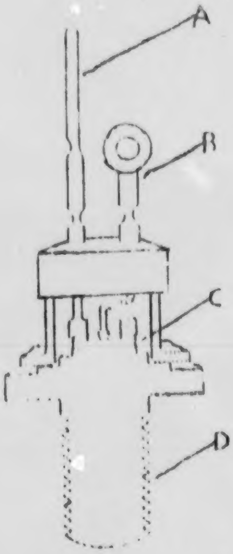
   a. alpha.
   b. mu.
   c. leakage.
   d. beta.

8. Greater bias stability can be obtained by connecting a resistor between what two elements in a transistor? (common emitter circuit)

   a. emitter and ground.
   b. emitter and base.
   c. base and collector.
   d. emitter and collector.

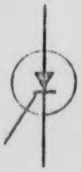
9. Identify the terminal in the illustration that is the cathode terminal?

   a. D
   b. A
   c. B
   d. C



10. What type of device is illustrated?

   a. PNP power
   b. WPN power
   c. SCN
   d. SCR



LAP TEST ANSWER KEY: TRANSISTOR APPLICATIONS

1. A
2. C
3. C
4. D
5. B
6. A
7. D
8. B
9. B
10. D

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Black and White Trouble

OBJECTIVE:

Describe black and white trouble symptoms given a typical picture and a description of the sound conditions.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 2 in the response manual.
2. Complete the Practice Exercises for Lesson #2.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.02.03.A2-2

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LAP TEST: BLACK AND WHITE TROUBLE

1. If your high voltage and audio are normal but you have no raster, which section would you check?

   a. low voltage supply.
   b. tuner.
   c. picture tube.
   d. video section.

2. Black and white TV symptoms can be divided into sound symptoms, video symptoms and:

   a. antenna symptoms.
   b. tuner symptoms.
   c. raster symptoms.
   d. adjustment symptoms.

3. If your raster, video and audio are normal but your picture rolls horizontally across the screen, what section would you trouble shoot?

   a. horizontal A.F.C.
   b. horizontal output.
   c. sync section.
   d. vertical sync.

4. If the raster and video are normal but the contrast is poor, what section would you trouble shoot?

   a. video.
   b. antenna.
   c. tuner.
   d. power supply.

5. If your TV set had no raster, no high voltage and no sound, what section would you trouble shoot?

   a. tuner.
   b. video section.
   voltage power supply.
   d. hi-voltage power supply.

6. If the audio in a TV set is weak in volume, what part of the audio section would you trouble shoot?

   a. detector.
   b. sound FF.
   c. video output.
   d. power amplifier.

7. If your video and audio are normal but your raster is pulled down from the top, what section would you trouble shoot?

   a. horizontal output.
   b. low voltage power supply.
   c. vertical output.
   d. video output.

8. If the raster and audio are normal but all you have on the screen is snow, what section would you trouble shoot?

   a. tuner.
   b. low-voltage power supply.
   c. video section.
   d. sync section.

9. If everything is normal in your TV but the picture rolls vertically and the vertical hold control won't prevent it from rolling, what section would you trouble shoot?

   a. sync section.
   b. vertical hold control.
   c. horizontal section.
   d. tuner.

10. If your TV raster has a black bar running through it and there is a loud hum in the audio, what section would you check?

   a. picture tube.
   b. low voltage power supply.
   c. hi voltage power supply.
   d. video output section.

LAP TEST ANSWER KEY: BLACK AND WHITE TROUBLE

1. C
2. C
3. A
4. A
5. C
6. D
7. C
8. A
9. A
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Sound, Video and Raster Symptoms

OBJECTIVE:

Describe a set of given sound video and raster symptoms. Identify the television section suspected of producting the given symptoms.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 our of 10 items on a multiple-choice test.

RESOURCES:

Black and White Television Diagnosis Sheet.
Television Symptom Diagnosis: Student Response Manual, Tinnell.
Film Loop #02, Identifying Sound, Video and Raster Symptoms.
Projector.

PROCEDURE:

1. Read page 19 in the response manual.

2. View Film Loop #02 and complete the film loop activities.

3. Check the activity answers with the answer key.

4. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.02.04.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: SOUND VIDEO AND RASTER SYMPTOMS

1. If you have an audio problem (no sound in your TV receiver) and you trouble shoot all of the audio circuit but still can't find the problem, what should you check next?

   a. I.F. amplifier.
   b. speaker.
   c. video amplifier.
   d. low-voltage power supply.

2. In a TV receiver, contrast is defined as the __________ of black picture area compared to white areas.

   a. brightness.
   b. gray scale.
   c. darkness.
   d. lightness.

3. If you trouble shoot a tuner in a TV receiver and you still have a considerable amount of snow in your picture, what section would you next trouble shoot?

   a. video amp.
   b. sync section.
   c. low voltage power supply.
   d. I.F. amp.

4. In a color TV can you have good vertical sync but still have poor horizontal sync?

   a. yes.
   b. no, because the sync separator is working.
   c. yes, but only in a color TV.
   d. no.

5. If the raster didn't completely fill the screen on all four sides of a television receiver, what part of the TV would you trouble shoot?

   ltage power supply.
   b. hi voltage power supply.
   c. video output.
   d. horizontal output stage.

6. What signals does a TV antenna receive on a B/W set?

    a. just audio.
    b. just I.F. signal.
    c. both audio and video.
    d. just video.

7. In a B/W receiver, if your sound is distorted, could the problem be in the video I.F. amp?

    a. yes.
    b. only in a color TV.
    c. might be an audio problem.
    d. no.

8. In your TV set, if the picture rolls both vertically and horizontally, what section would you trouble shoot?

    a. horizontal sweep.
    b. vertical sweep section.
    c. sync section.
    d. low-voltage supply.

9. If you diagnosed a TV with a white line on a black background running from left to right on your screen, what section would you trouble shoot?

    a. horizontal sweep.
    b. low-voltage power supply.
    c. vertical sweep.
    d. hi-voltage supply.

10. If your TV set has no audio, raster or high voltage, but the filaments of the tubes light, what section would you trouble shoot?

    a. high-voltage power supply.
    b. low-voltage power supply.
    c. video output.
    d. 110 vac supply.

LAP TEST ANSWER KEY: SOUND, VIDEO AND RASTER SYMPTOMS

1. B
2. C
3. D
4. A
5. A
6. C
7. A
8. C
9. C
10. B

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File Code: 77.04.02.05.A2-0

Date Published: 12-16-76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: The Sound I-F Section

OBJECTIVE:

Describe typical sound symptoms that are related to malfunctions in the sound intermediate frequence (IF) section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into TV Servicing, Tinnell.
Photofact Television Course by Sam's Staff.

PROCEDURE:

1. Read Chapter 4 in An Entry Into TV Servicing.
2. Read Chapter 14 in Photofact Television Course.
3. Answer the review questions at the end of each chapter for steps 1 and 2.
4. Check your answers with the answer key.
5. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.02.05.A2-2

Date: ______________________ **Date Published:** 11/29/77

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LAP TEST: THE SOUND I-F SECTION

1. The best way to check an I.F. amplifier tube in the audio section of a TV set is by:

   a. visual observation.
   b. tube tester.
   c. substitution.
   d. checking voltages.

2. In what stage of the audio section is the sound signal converted to the audio signal?

   a. speaker.
   b. audio amplifier.
   c. I.F. section.
   d. detector.

3. In a B/W TV, where does the sound come from?

   a. tuner.
   b. power supply.
   c. video amplifier.
   d. I.F. amp.

4. What is the frequency of the sound signal in a TV coming from the video amplifier?

   a. 4.5 KHZ
   b. 4.5MHZ
   c. .45 MHZ
   d. 4.5 HZ

5. In a TV audio section, is it common for the detector and sound I.F. amplifier to be located in one I.C.?

   a. no.
   b. only in a solid state TV.
   c. [illegible]

6. If you have found a bad I.C., what part of it would you change?

   a. all of it.
   b. none of it, the I.C. can always be repaired.
   c. only the part that registered bad on the ohmmeter.
   d. only the part that registered bad on the voltmeter.

7. Conversion of the sound signal to an audio signal is done in the:

   a. AFC.
   b. tuner.
   c. detector.
   d. AGC.

8. What devices are used to house the I.F. amp, detector and audio amp together in one core?

   a. duo diode-triode.
   b. integrated circuit.
   c. diode.
   d. transistor.

9. When trouble shooting integrated circuits, what do you check?

   a. the current.
   b. the resistance.
   c. the wattage.
   d. the voltage.

10. How many frequencies does the sound I.F. section amplify in a TV set?

    a. seven.
    b. two.
    c. four.
    d. one.

LAP TEST ANSWER KEY: THE SOUND I-F SECTION

1. C
2. D
3. C
4. B
5. D
6. A
7. C
8. B
9. D
10. D

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Sound Troubles

OBJECTIVE:

Given a description of an audio malfunction, identify the audio stage(s) in which the trouble exists.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson #3 in the response manual.
2. Complete the Practice Exercises for Lesson #3.
3. Check answers with the key.
4. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.02.06.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: SOUND TROUBLES

1. Can the antenna affect the sound in any way in a TV set?

   a. no.
   b. yes.
   c. rarely.
   d. only affects the tuner.

2. Can the tuner in a TV set affect the sound?

   a. no.
   b. rarely.
   c. yes.
   d. only the video.

3. In a TV audio section, what section is defined as a circuit which amplifies the FM radio sound?

   a. driver.
   b. detector.
   c. sound I.F. amp.
   d. audio amp.

4. If you have no sound and you vary the volume control in a TV set but there are no changes of the audio, where might the trouble be?

   a. video amp.
   b. detector.
   c. sound I.F. amp.
   d. audio amp.

5. The circuit which separates the video signal from the FM radio carrier in a television receiver is called:

   a. detector.
   b. audio amp.
   c. I.F. amp.
   d. driver.

6. If in the TV audio section, you have a loud hum coming through both audio and video, what section would you trouble shoot?

   a. low-voltage power supply.
   b. audio section.
   c. video section.
   d. sync section.

7. If the video amp fails in a TV receiver, can you still have a sound signal?

   a. yes.
   b. only in a color TV.
   c. maybe.
   d. no.

8. To make an electronic signal stronger in a TV set you have to ________ it.

   a. demodulate.
   b. amplify.
   c. color.
   d. rectify.

9. In a TV audio section, the circuit which amplifies audio signals is called:

   a. sound I.F. amp.
   b. video amp.
   c. detector amp.
   d. audio amp.

10. If your video is very faint, what part of the TV would you trouble shoot?

   a. audio output.
   b. video amp.
   c. detector.
   d. sound I.F.

LAP TEST ANSWER KEY: SOUND TROUBLES

1. B
2. C
3. C
4. D
5. A
6. A
7. D
8. B
9. D
10. B

File Code: 77.04.02.07.A2-0

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Isolating Sound Troubles

OBJECTIVES:

Given an audio malfunction, identify the audio stage(s) in which the trouble exists.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black and White Television Diagnosis Sheet.

Film Loop #03, Isolating Sound Troubles.

Projector.

PROCEDURE:

1. View Film Loop #03 and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.02.07.A2-2

Date: ______________________ **Date Published:** 11/29/77

Family Education Program

LAP TEST: SOLID STATE AUDIO SECTION

1. Why must the sound carrier signal be kept at a lower amplitude as compared to the picture carrier signal?

   a. to attentuate audio interference.
   b. the audio circuit has more signal gain.
   c. to have better AGC action.
   d. to keep the audio signal and color signal from cancelling.

2. What is the band width of a 4.5Mhz sound amplifier in most solid-state receivers?

   a. 50 Mhz
   b. 4.5 Khz
   c. 4.5 Mhz
   d. 50 Khz

3. An audio fm demodulator generally use what type coupling between the audio stages?

   a. capacitor-resistor.
   b. resistor-double tuned transformer.
   c. double-tuned transformer.
   d. single-tuned transformer.

4. Since a discriminator cannot reject amplitude modulation, what must always precede the discriminator?

   a. capacitor.
   b. double-tuned transformer.
   c. limiter.
   d. detector.

5. Why is it important to have a speaker or a load connected to the output amplifier when it is operating?

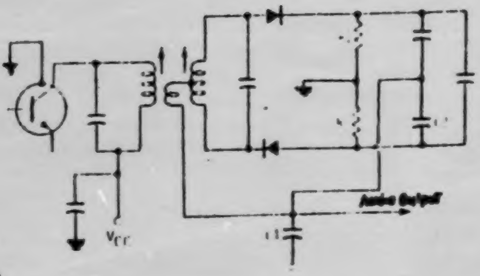
   a. 3.2 ohm match to speaker.
   b. high peak-inverse voltage.
   c. low ak-inverse voltage.
   nce match.

6. Which audio circuit are FET's used quite extensively?

   a. audio driver and tone control.
   b. audio output.
   c. tone circuits.
   d. discriminator circuits.

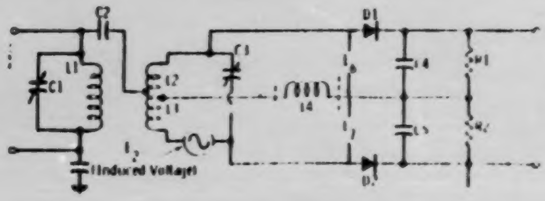
7. What type of audio circuit is illustrated?

   a. pre-emphasis circuit.
   b. ratio-detector.
   c. discriminator.
   d. de-emphasis circuit.


Vcc
Audio Output

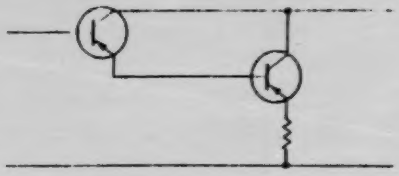
8. What type of audio circuit is illustrated?

   a. de-emphasis.
   b. limiter.
   c. discriminator.
   d. ratio-detector.


C2
D1
L1
C1
C4
R1
L4
C5
(Induced Voltage)
D2

9. What type of circuit is illustrated?

   a. darlington pair.
   b. punch-pull output.
   c. 2 PNP drivers.
   d. impedance balance.



10. In what section is spurious amplitude modulated signal removed from the audio signal?

   a. detector.
   b. driver.
   c. output.
   d. limiter.

LAP TEST ANSWER KEY: SOLID STATE AUDIO SECTION

1. A
2. D
3. C
4. C
5. B
6. A
7. B
8. C
9. A
10. D

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Glasgow AFB, Montana 59231

File Code: 77.04.02.08.A2-0

Date Published: 12-16-76

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Solid State Audio Section

OBJECTIVE:

Identify characteristics associated with a solid state audio section.

EVALUATION PROCEDURE:

RESOURCES:

Transistor TV Training Course by Robert G. Middleton

PROCEDURES:

1. Read Chapter 10, "Intercarrier Sound and Audio Sections" in the above resource.
2. Answer the questions at the end of the chapter.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.02.08.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: ISOLATING SOUND TROUBLES

1. If the horizontal A.F.C. circuit is bad, would this affect the audio section?

   a. yes, if there is an oscillator problem.
   b. no.
   c. yes, if the vertical sync is bad also.
   d. yes, under any conditions.

2. Which section of a TV set audio circuit does the volume control sit in?

   a. demodulator circuit.
   b. audio amp.
   c. speaker circuit.
   d. detector.

3. In a TV receiver, if you have poor sync, will this affect the audio?

   a. maybe, if you have good video.
   b. yes.
   c. yes, if it is a color set.
   d. no.

4. Would the A.C.C. in a TV affect the audio?

   a. yes.
   b. no, because the A.C.C. doesn't go to the sound section.
   c. no.
   d. maybe, only if the A.C.C. isn't working.

5. What is the frequency that the sound I.F. amp will pass in a TV?

   a. 4.5 MHZ
   b. 60 HZ
   c. one HZ
   d. 15,750 HZ

6. If your audio is dead but your picture is o.k. and you have checked everything from the speaker through the detector stage but still can't find it, [illegible]on would you check next?

   a. tuner.
   b. video section.
   c. power supply.
   d. video I-F section.

7. If your audio is dead in a TV set but there is a faint hum and volume control has no effect, the problem is in the:

   a. driver.
   b. speaker.
   c. I.F. amp.
   d. tuner.

8. In a TV receiver, if your picture is o.k. but there is no audio and there is a faint hum and your speaker is o.k., what section would you check next?

   a. detector.
   b. audio output.
   c. volume control.
   d. sound I.F. amp.

9. If the audio in a TV set is dead but there is a faint hum, your problem is in the:

   a. driver.
   b. video I.F. amp.
   c. detector.
   d. speaker.

10. The audio signal in a TV set coming from the video output is coupled into what part of the audio circuit?

   a. audio driver.
   b. audio amp.
   c. sound detector.
   d. sound I.F.

LAP TEST ANSWER KEY: ISOLATING SOUND TROUBLES

1. B
2. B
3. D
4. C
5. A
6. B
7. A
8. D
9. C
10. D

File Code: 77.04.02.09. A1-0

Date Published: 7/12/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Transistor/F.E.T. Tester

OBJECTIVES:

Given an assortment of semi-conductors, semi-conductor replacement guide, data sheet and a semi-conductor tester, test and record a semi-conductor beta and leakage measurement.

EVALUATION PROCEDURE:

Successfully complete 80% of the questions on the LAP test. Student Performance Data Sheet must have 100% of the line items correct.

RESOURCES:

Instruction Manual for B&K Model 162 Transistor/F.E.T. checker.
B&K Model 162 Transistor/F.E.T. tester.
Semi-conductor Replacement Guide

PROCEDURES:

1. Read "Introduction", "Testing Simplified", "Determining Common Failures" in the above resource.
2. Obtain semi-conductor assortment.
3. Read "Programmed Step-By-Step Guide" in the instruction manual.
4. Test and record the semi-conductor measurements using a semi-conductor guide and the attached Practice Data Sheet.
5. Have an instructor verify your data sheet.
6. If satisfactory, take the LAP test.
7. If not satisfactory, proceed as directed by the instructor.
8. After taking the LAP test, obtain the semi-conductor assortment and fill out the attached Performance Data Sheet.

Principal Author(s): B. Vetter

1. What are the two basic types of transistors?

   * a. PNP/NPN
   b. NPP/PPN
   c. NNP/PNP
   d. NPN/PNN

2. What are the two basic kinds of transistors?

   * a. signal and power
   b. signal and divider
   c. power and divider
   d. silicon and germanium

3. When checking a signal transistor out of circuit, what position should the range switch be placed?

   * a. 10m A
   b. 100m A
   c. 10A
   d. .10A

4. The following symbol depicts what type of semi-conductor?

   a. FET
   b. NPN
   c. PNP
   d. SCR

5. Why must transistor leakage tests be made "out of circuit?"

   * a. impedance is high
   b. damaging "in circuit components"
   c. to prevent transistor "switching"
   d. the battery drain is too high

6. For small signal devices, ICBO will be less than:

   a. 1UA
   b. 1MA
   c. 10UA
   d. 10MA

7. For high power semi-conductors, especially germanium, ICBO may go as high as:

   a. 5UA
   [illegible]
   c. 1UA
   d. 1MA

8. The signal semi-conductor device is bad when the IBCO leakage is greater than:

   a. 2UA
   b. 20UA
   c. 5UA
   d. 2MA

9. When measuring leakage in a signal semi-conductor, the ICEO should be greater than what?

   * a. ICES
   b. ICBO
   c. Beta
   d. IDSS

10. Signal device leakage testing is based on the principle that under normal circumstances, ICES should be greater than:

    a. ICBO
    b. ICEO
    c. Beta
    d. IGSS

11. To find the most likely solid state device which may have foiled in a faulty circuit you first:

    a. check power devices
    b. check input devices
    c. check for proper heat dissipation on heat sink
    d. cross-check transistor to manual

12. When making the battery test on the checker, you short together what two leads?

    a. collector to emitter
    b. collector to base
    c. base to emitter
    d. emitter to ground

13. How many batteries are in the B&K 162 transistor checker?

    a. 3
    b. 2
    c. 4
    d. 1

14. How low must the Beta reading of a signal device be to be considered bad?

    a. 10
    b. 25
    c. 15
    d. 1

15. When checking a solid-state device and it becomes warm, this indicates:

   a. short
   b. wrong setting
   c. wrong transistor
   d. low batteries

PERFORMANCE DATA SHEET

Number	Minimum Reading	Your Reading (Beta)	Leakage (Megohms)

PRACTICE DATA SHEET

		Minimum Reading	Your Reading (Beta)	Leakage (Megohms)
.	~~Tube~~ Number~~s~~			

Student: ______________________ File Code: 77.04.02.09.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: TRANSISTOR/FET TESTER

1. What are the two basic types of transistors?

    a. NPP/PPN
    b. NNP/PNP
    c. NPN/PNN
    d. PNP/NPN

2. What are the two basic kinds of transistors?

    a. signal and power.
    b. signal and amplifier.
    c. power and divider.
    d. power and amplifier.

3. Why must transistor leakage tests be made "out of circuit"?

    a. to prevent transistor "switching".
    b. the battery drain is too high.
    c. transistor impedance is high.
    d. damaging "in circuit components".

4. For small signal devices, ICBO will be less than:

    a. 10MA
    b. 1UA
    c. 1MA
    d. 10 UA

5. When measuring leakage in a signal semi-conductor, the ICEO should be greater than what?

    a. Beta
    b. IDSS
    c. IDES
    d. ICBO

6. Signal device leakage testing is based on the principle that under normal circumstances, ICES should be greater than:

    b. ICEO
    c. Beta
    d. IGSS

7. How long must the Beta reading of a signal device be to be considered bad?

   a. 10
   b. 25
   c. 15
   d. 1

8. For high power semi-conductors, especially germanium, ICBO may go as high as?

   a. 1UA
   b. 1MA
   c. 5UA
   d. 5MA

9. To find the most likely solid-state device which may have failed in a faulty circuit you first:

   a. cross check transistor to manual.
   b. check power devices.
   c. check input devices.
   d. check for proper heat dissipation on the heat sink.

10. When checking a solid state device and it becomes warm, this indicates?

   a. short.
   b. wrong setting.
   c. wrong transistor.
   d. low batteries.

LAP TEST ANSWER KEY: TRANSISTOR/FET TESTER

1. D
2. A
3. C
4. B
5. C
6. A
7. A
8. C
9. B
10. A

File Code: 77.04.02.10.A2-0

Date Published: 12/16/76

Mountain-Plains Education &
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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Sound Troubles

OBJECTIVE:

Diagnose and repair the audio section of a given television set.

EVALUATION PROCEDURE:

Diagnostic and repair skills will be tested on the unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black and White Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst, B and K Division of Dynascan Corp.
Desoldering irons.
Desoldering tools.
Hand tools.
Oscilloscope.
Soldering irons.
Soldering tools.
TSD Trainer.
Television Analyst, B and K Model 1077B.

PROCEDURE:

1. Go to the instructor for assignment of a work station where you will complete this LAP.

2. Read "VHF Signal", pages 12-13 and "4.5 MHz and 1 KHz Signals", on page 28 in Instruction Manual for Model 1077 Television Analyst.

3. Turn on the television set and diagnose the receiver using the television

4. After diagnosis is completed, fill in all requested data on a diagnosis sheet.

5. Turn off all instruments and equipment. Clean up the work station. Replace all tools and supplies in their proper places.

Principal Author(s): R. Arneson, B. Vetter

PROCEDURE: (continued)

6. Turn in the diagnosis sheet to the instructor for evaluation.
7. Connect the malfunction.
8. Take the LAP test.

Student: ______________________ **File Code:** 77.04.02.10.A2-2

Date: ______________________ **Date Published:** 11/29/77

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LAP TEST: DIAGNOSING SOUND TROUBLES

1. If capacitor C303 opened, would this affect the voltage on the collector of Q6? (See diagram 4)

   a. yes, if it shorted through C302.
   b. yes.
   c. no, because the circuit breaker would fail.
   d. no.

2. Why do we need two transistors in this audio I.F. section? (See diagram 4)

   a. detection.
   b. because of the transformer loss.
   c. demodulation.
   d. amplification.

3. What type of transistor is Q8? (See diagram 6)

   a. NPN
   b. PPN
   c. NNP
   d. PNP

4. What is the base voltage on Q6 transistor in the audio section? (See diagram 4)

   a. 0 v.
   b. .7 v.
   c. 35 v.
   d. 11 v.

5. What is the frequency of the transformer T300? (See diagram 4)

   a. 60 HZ
   b. 15,750 HZ
   c. 8.10 MHZ
   d. 4.5 MHZ

6. What frequency would you adjust A9 to in the audio I.F.? (See diagram 6)

   a. 15,750 HZ
   b. 450 MHZ
   c. 60 HZ
   d. 4.5 MHZ

7. What is your base voltage on Q6 transistor? (See diagram 5)

   a. 1.6 volt.
   b. 23.5 volts.
   c. 1.0 volt.
   d. 2.2 volt.

8. If capacitor C39 shorted, what would happen to R47 resistor? (See diagram 5)

   a. it will burn up.
   b. cannot be determined from the diagram.
   c. would depend on the flow of current.
   d. nothing.

9. What is your base voltage on Q8 transistor? (See diagram 6)

   a. 9.0 v.
   b. 5.06 v.
   c. 4.45 v.
   d. 76 v.

10. What is the base voltage on Q7 transistor? (See diagram 4)

   a. 5 v.
   b. 1.05 v.
   c. 0 v.
   d. .55 v.

LAP TEST ANSWER KEY: DIAGNOSING SOUND TROUBLES

1. D
2. D
3. A
4. B
5. D
6. D
7. A
8. A
9. B
10. D

Student: ____________________ File Code: 77.04.02.00.B2-2

Date: ____________________ Date Published: 7/29/75

Mountain-Plains Education &
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UNIT POST TEST: TELEVISION AUDIO SECTION TROUBLES

77.04.02.01

1. The transformer windings in power amplifiers in television audio ciruits can be checked with a(n):

   a. ohmmeter.
   b. ammeter.
   c. voltmeter.
   d. signal generator.

2. If the transformer T4 in the audio section shorted in the secondary windings, would you have any audio? (See diagram 2)

   a. no.
   b. yes, but only noise.
   c. yes, but only a low whistle.
   d. yes.

3. In the video section, what would happen if A9 of the transformer L8 opened up? (See diagram 2)

   a. lose video.
   b. poor video.
   c. lose audio.
   d. poor sound.

4. Referring to L12 of the audio section, what is your symptom if C27 shorts? (See diagram 3)

   a. transformer would burn up.
   b. no audio, but have a low hum.
   c. good audio.
   d. no sound at all.

5. The three main parts of a speaker are the terminals, the magnet and the:

   a. transformer.
   c. volume control.
   d. voice coil.

77.04.02.02

6. If your video and audio are normal but your raster is pulled down from the top, what section would you trouble shoot?

   a. vertical output.
   b. low voltage power supply
   c. horizontal output.
   d. video output.

7. If your raster and audio are normal but the contrast is poor, what section would you trouble shoot?

   a. video.
   b. antenna.
   c. tuner.
   d. power supply.

8. What is snow in the picture of a TV receiver caused by?

   a. bad video components.
   b. atmospheric noise.
   c. improper fine tuning.
   d. hum bars.

9. If the audio in a TV set is very weak in volume, what part of the audio section would you trouble shoot?

   a. detector.
   b. power amplifier.
   c. video output.
   d. sound I.F.

10. If the raster and audio are normal but all you have on the screen is snow, what section would you trouble shoot?

    a. video section.
    b. low-voltage power supply.
    c. sync section.
    d. tuner.

77.04.02.03

11. In a TV receiver, if you have snow, good audio, and high voltage, could you still have a video problem?

    a. yes, if the high voltage wasn't missing.
    b. yes.
    c. only if the tuner doesn't work.
    d. no.

77.04.02.03 cont.

12. In a B/W receiver, if your sound was distorted, could the problem be in the video I.F. amp?

    a. might be an audio problem.
    b. no.
    c. only in a color TV.
    d. yes.

13. In a TV receiver if you have a good signal from your antenna but the raster has a lot of snow, what section of the set would you trouble shoot?

    a. hi voltage power supply.
    b. video.
    c. tuner.
    d. low voltage power supply.

14. If your TV set has no audio, raster or high voltage but the filaments of the tubes light, what section would you trouble shoot?

    a. low-voltage power supply.
    b. 110 vac supply.
    c. video output.
    d. high-voltage power supply.

15. What signals does a TV antenna receive on a B/W set?

    a. just the I.F. signal.
    b. just audio.
    c. just video.
    d. both audio and video.

77.04.02.04

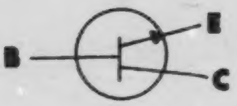
16. The volume control in the audio section of a TV is in which area?

    a. power supply.
    b. audio detector.
    c. audio amplifier.
    d. sound I.F.

17. What type of transistor is there?

    a. PPN
    b. NNP
    [illegible]
    d. PNP

18. What type of transistor is this?



a. PNP
b. NNP
c. NPN
d. PPN

19. In a transistorized audio amp circuit, the collector of the audio output transistor is usually connected to the:

a. transformer secondary side.
b. transformer, primary side.
c. speaker.
d. resistor.

20. A power transistor in an audio output amplifier can be tested by removing it from the circuit and measuring the terminal:

a. voltager.
b. current.
c. resistances.
d. watts.

77.04.02.05

21. What stage of the audio section in a TV is the sound signal **converted to** audio signal?

a. speaker.
b. audio amplifier.
c. I.F. section.
d. detector.

22. About what percent of the collector supply voltage should the collector to emitter voltage read in a transistorized TV?

a. 50%
b. 100%
c. 75%
d. 90%

23. What determines the frequency your sound I.F. section will pass in a TV set?

a. tuneable transformer.
b. detector.
c. [illegible] amp.
d. video I.F. amp.

24. If you have found a bad I.C., what part of it would you change?

    a. none of it, you can always repair it.
    b. all of it.
    c. only the part that registers bad on the ohmmeter.
    d. only the part that registers bad on a voltmeter.

25. How many frequencies does the sound I.F. section amplify in a TV set?

    a. two.
    b. seven.
    c. four.
    d. one.

77.04.02.06

26. If the TV set you are trouble shooting has no voltage in the audio section, what section should you check next?

    a. low-voltage power supply.
    b. high-voltage power supply.
    c. tuner.
    d. audio-output stage.

27. Can the tuner in a TV set affect the sound?

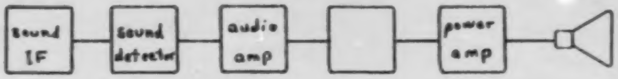
    a. rarely.
    b. can only affect the video.
    c. yes.
    d. no.

28. Can the antenna affect the sound in any way in a TV set?

    a. rarely.
    b. no.
    c. only the tuner.
    d. yes.

29. In the following block diagram, what section is blank?

    a. video amp.
    b. sync section.
    c. driver amp.
    d. speaker.



30. If you have no sound, and you vary the volume control in a TV set but there are no changes in the audio, where might the trouble be?

    a. detector.
    b. sound I.F. amp.
    c. video amp.
    d. audio amp.

77.04.02.07

31. In a 100% solid state TV, what actually detects the sound?

    a. transistors.
    b. diodes.
    c. transformers.
    d. tubes.

32. The audio signal in a TV set coming from the video output is coupled into what part of the audio circuit?

    a. audio driver.
    b. sound detector.
    c. audio amp.
    d. sound I.F.

33. If your audio is dead in a TV set but there is a faint hum and volume control has no effect, the problem is in the:

    a. speaker.
    b. I.F. amp.
    c. driver.
    d. tuner.

34. In a TV set, if the audio is dead and there is no hum, the problem is the:

    a. I.F. amp.
    b. speaker.
    c. driver.
    d. tuner.

35. In a TV receiver, if you have poor sync, will this affect the audio?

    a. yes, if it is a color set.
    b. no.
    c. maybe, if you have good video.
    d. yes, at all times.

77.04.02.08

36. What is your base voltage on Q8 transistor? (See diagram 6)

    a. 76 v.
    b. 9.0 v.
    c. 5.06 v.
    d. 4.45 v.

37. If capacitor C39 shorted, what would happen to R47 resistor? (See diagram 5)

    a. this cannot be determined from the diagram.
    b. it would depend on how much current was shorted out.
    c. it will burn up.
    d. nothing.

38. What is the base voltage on Q7 transistor? (See diagram 4)

a. 1.05 v.
b. .55 v.
c. 5 v.
d. 0 v.

39. What is your base voltage on Q6 transistor? (See diagram 5)

a. 1.6 v.
b. 23.5 v.
c. 1.0 v.
d. 2.2 v.

40. Why can you get audio through T100 or A11 coil when both sides are grounded? (See diagram 4)

a. its "above" ground.
b. C300 does it.
c. C128 does it.
d. C301 does it.

UNIT POST TEST ANSWER KEY: TELEVISION AUDIO SECTION TROUBLES

LAP .01

1. A
2. A
3. C
4. B
5. D

LAP .02

6. A
7. A
8. B
9. B
10. D

LAP .03

11. D
12. D
13. C
14. A
15. D

LAP .04

16. C
17. D
18. C
19. B
20. C

LAP .05

21. D
22. D
23. A
24. B
25. D

LAP .06

26. A
27. C
28. D
29. C
30, D

LAP .07

31. B
32. D
33. C
34. B
35. B

LAP .08

36. C
37. C
38. B
39. A
40. A

Student: ____________________ File Code: 77.04.02.00.A1-5

Date: ____________________ Date Published: 11/25/75

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Family Pay Number: __________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: TELEVISION AUDIO SECTION TROUBLES

OBJECTIVE 1:

The student will diagnose malfunctions with regard to audio section failure.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunctions in the audio section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the audio section.

The term "audio section" refers to the following:

1. Sound I-F section
2. Audio amplifier section.
3. Audio detector

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. No audio
2. No video
3. No raster
4. Excessive snow
5. Poor vertical linearity

The student will then be expected to diagnose, troubleshoot, localize, and repair whatever defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering pencil and iron, B & K television analyst, oscilloscope, tube checker, volt-ohmmeter, needle nose pliers, screwdriver, desoldering tools and replacement components.

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Student: ____________________ **File Code:** 77.04.02.00.A1-5

Date: ____________________ **Date Published:** 11-14-74

Family Pay Number: __________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose audio failure.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to audio section		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to audio		
failure.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to audio failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to audio failure.		

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

Student must meet criterion on all line items to obtain an overall score of satisfactory.

BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

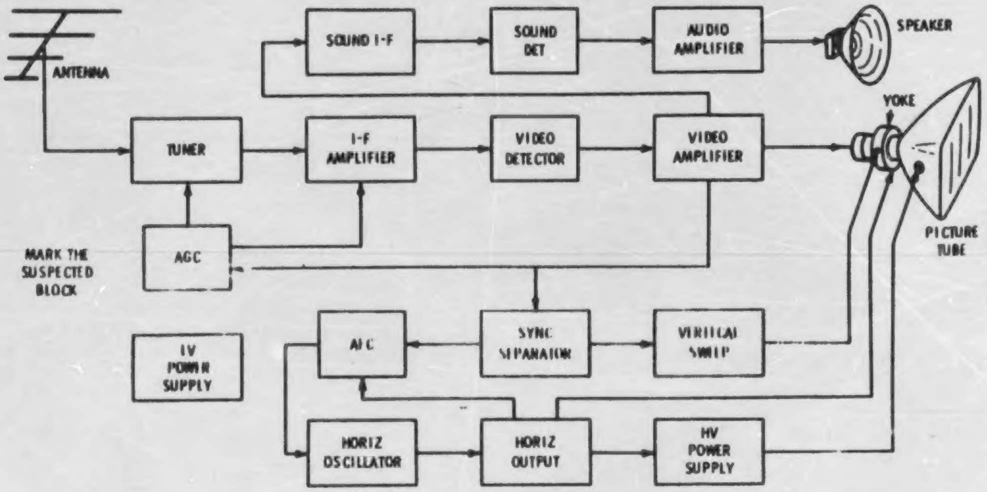
1.

Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2.

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**
DIAGNOSIS (suspected block) and comments:		

3.


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
MARK THE SUSPECTED BLOCK
AGC
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

CORRECTIVE ACTION (suggested or taken):

When your diagnosis is complete, continue with the remainder of the lesson.

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

check for audio
check for video
check for raster
check for snow
check for linearity

OBJECTIVE 2: Troubleshooting

Line item 2:

obtains and uses a schematic diagram .
Takes voltage readings in relation to the diagram .
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

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Learning Experience Guide

RATIONALE:

In the servicing of a television receiver and identification of troubles in the video section is part of the task. Isolating troubles in a video stage requires knowledge about the normal operation of these stages and how abnormal operation is identified and corrected. Successful completion of activities in this unit will enable you to obtain that knowledge.

PREREQUISITES:

Unit .02: Television Audio Section Troubles

OBJECTIVE:

Recognize symptoms of trouble; diagnose difficulties; make necessary adjustments; remove, repair, and replace components for the video stages of the television receiver.

RESOURCES:

Printed Materials

Black & White Television Diagnosis Sheet
Instruction Manual For 1077 Television Analystl B & K Division of Dynascan Corporation, 1968.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62 Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1970
Transistor TV Training Course. Robert G. Middleton, Howard W. Sams Co. 1973
Photofact Television Course. Howard W. Sams Editorial Staff. Howard. W. Sams Co. 1975.
Color-TV Tra[illegible] Manual. Howard [illegible] S[illegible] Editorial Staff. Howa[illegible] W Sams Co. 1974.
Motorola [illegible] Service Manual. Motorola Consumer Dept. Motorola Inc. [illegible]klin Park Ill. 1973.

Audio/Visual

Super 8 Sound Film:

Television Symptom Diagnosis Series TSD-133. (Film Loop #04, 05, 06, & 07) Hickok Teaching Systems, Inc., Woburn, Massachusetts
Sony VO1800 Video Tape Recorder. Sony Corp. Of America, New York, New York.
Sony CVM 194 B & W Video Monitor. Sony Corp. of America, New York, New York.

RESOURCES (cont.)

Equipment

Color T.V.
Desoldering iron.
Desoldering tools.
Iron, soldering.
Kit, Service Master 99SM or equivalent, Xcelite 99SM Kit, Jensen Tools and Alloys. 4117 North 44th Street, Phoenix, Arizona.
Meter, volt-ohm.
Oscilloscope.
Projector, Super 8 Sound Film, Model 60, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Television Analyst, B & K Model 1077B, Dynascan Corporation 1801 West Belle Plain Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, KT-185Y, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Tools, soldering.
Vacuum tube checker.

GENERAL INSTRUCTIONS:

This unit consists of sixteen Learning Activity Packages (LAPS). Each LAP will provide specfic information for completion of a learning activity.

The general procedure for this course is as follows:

1. Read the assigned unit LEG for this course.
2. Begin and complete the first assigned LAP.
    a. Take and score the LAP test.
    b. Turn in the LAP test answer sheet.
    c. Determine the reason for any missed items on the LAP test.
    d. Proceed to the next assigned LAP in the unit.
    e. Complete all required LAPs for the unit by following steps (a) through (d).
3. Take the unit tests as described in the Unit LEG "Evaluation Procedures".
4. Proceed to the next assigned unit in this course.
5. Follow steps 1 through 4 for all required units for this course.
6. Proceed to the next assigned course.

You will work independently unless directed to do otherwise. When questions or problems arise, you are expected to discuss them with the instructor. At all times remember to follow correct safety procedures during the performance activity.

PERFORMANCE ACTIVITIES:

.01 Television Picture Tubes
.02 Normal Sound-No Video
.03 Symptoms of Normal Sound but No Video
.04 Diagnosing Normal Sound-No Video
.05 Troubleshooting Video Failures
.06 No Sound, No Video, Raster Normal
.07 Symptoms of No Sound, No Video, Raster Normal
.08 Diagnosing No Sound, No Video, Raster Normal
.09 Picture I-F Problems
.10 I-F Amplifier Troubles
.11 A Defective I-F Amplifier
.12 Diagnosing I-F Amplifier Troubles
.13 Tuner Troubles
.14 Identifying Tuner Problems
.15 A Defective Tuner
.16 Diagnosing Tuner Troubles

EVALUATION PROCEDURE

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After reading this Unit guide, begin reading the LAP for the first assigned performance activity. As you perform the tasks of each activity, you are expected to use the knowledge and skills acquired in the prerequisite for this Unit.

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UNIT PRETEST: TELEVISION VIDEO SECTION TROUBLES

77.04.03.01

1. The negative voltage on the grid neutralizes the positive voltage of which element in a crt?

   a. cathode.
   b. first anode.
   c. control grid.
   d. second anode.

2. By controlling the electron beam current, what characteristic of the spot may be varied?

   a. focus.
   b. brightness.
   c. position.
   d. contrast.

3. Where is the second anode of a picture tube located?

   a. the screen.
   b. the neck.
   c. the base.
   d. the bell of the tube.

4. What happens when the electron beam strikes the phosphor dot on the screen?

   a. it becomes highly positive.
   b. it glows.
   c. it falls off.
   d. it becomes highly negative.

5. What is another name for the heater in a crt?

   a. anode.
   b. grid.
   c. filament.
   d. cathode.

77.04.03.02

6. The signal that carries only picture information is called:

    a. R.F. signal.
    b. I.F. signal.
    c. sync.
    d. video.

7. The elements that are located in the neck of the picture tube are called:

    a. the controllers.
    b. the electron guns.
    c. the emitters.
    d. the triads.

8. Besides sync, AGC, and video, what else is emitted by the video circuit?

    a. high voltage.
    b. brightness.
    c. contrast.
    d. sound.

9. The letters "crt" stand for:

    a. contrast rejuvenator tube.
    b. cold receiver tube.
    c. constant resistance transformer.
    d. cathode-ray tube.

10. What element is located immediately behind the screen of a color crt?

    a. electron guns.
    b. anode.
    c. aperature mark.
    d. triads.

77.04.03.03

11. If a TV set has snow, good sound, and no picture, can this be classified as a video problem?

    a. occasionally.
    b. no.
    c. possibly.
    d. yes.

12. What [illegible] of transistor is Q5, video output? (See diagram 4)

    a. PNP
    b. NPN
    c. PNN
    d. A1S

77.04.03.03 cont.

13. If there is no video, but good audio, what should be the first area to be examined in a TV set?

    a. video driver.
    b. the detector.
    c. video output.
    d. video amp.

14. Besides crt, another technical name for a picture tube is a:

    a. black matrix.
    b. chroma color.
    c. kinescope.
    d. screen.

15. What other signal pulse is taken from the first video amp besides the sync pulse?

    a. brightness.
    b. AGC
    c. vertical sync pulse.
    d. horizontal drive pulse.

77.04.03.04

16. Besides sync, A.G.C. and video, what else is found in the video circuit?

    a. brightness.
    b. high voltage.
    c. contrast.
    d. sound.

17. What other signal pulse is taken from the first video amp besides the sync pulse?

    a. horizontal drive pulse.
    b. vertical sync pulse.
    c. A.G.C.
    d. brightness.

18. What attracts the electron towards the screen of the picture tube?

    a. the cathode.
    b. the phosphorus coating.
    c. the [illegible] field.
    d. the [illegible] anode.

77.04.03.04 cont.

19. What is the frequency of the sound I.F. in a TV set?

    a. 5 MHZ
    b. 4.5 KC
    c. 4.5 MHZ
    d. 455 KC

20. What element of the crt has the high voltage on it?

    a. the aquadag.
    b. the aperature mask.
    c. the cathode.
    d. the first anode.

77.04.03.05

21. The A.G.C. pulse for the tuner and I.F. is taken from the:

    a. R.F. amp.
    b. video driver.
    c. video output.
    d. sound take-off.

22. In which circuit is the brightness control located?

    a. yoke.
    b. video amp.
    c. crt circuitry.
    d. video output.

23. What is another name for an electron gun?

    a. second anode.
    b. grid.
    c. first anode.
    d. cathode.

24. The contrast control is found in which section of a black and white TV?

    a. yoke.
    b. video detector.
    c. picture tube.
    d. video amp.

25. How many cathodes does a color picture tube have that is manufactured in the U.S.?

    a. two.
    b. one.
    c. three.
    d. six.

77.04.03.06

26. How is one able to detect an A.G.C. problem when there is no video?

    a. by using a vom.
    b. via substitution.
    c. by using an oscilloscope.
    d. by using a signal generator.

27. If there is snow, good sound, but no picture present, will this be classified as a video problem?

    a. probably.
    b. no.
    c. occasionally.
    d. yes.

28. What would be the symptom of weak video on the crt?

    a. low contrast.
    b. low brightness.
    c. bent video.
    d. distorted sorter.

29. What happens to the raster when the contrast control is turned up?

    a. brightens.
    b. rolls vertically.
    c. darkens.
    d. loses sound.

30. Turning the A.G.C. control up on a TV will affect video, sound, and:

    a. horizontal drive.
    b. sync.
    c. brightness.
    d. color.

77.04.03.07

31. How much voltage drop is there across R62 in the second video amp? (See diagram 8)

    a. 80 v.
    b. 20 v.
    c. 120 v.
    d. 100 v

32. [illegible] resistor, R52, burned up, what would be the indication? [illegible] diagram 6)

    a. a short in the B+.
    b. shorted video output.
    c. shorted video set.
    d. L7 shorted.

33. Where does the 132 v boast in the video circuit come from? (See diagram 6)

   a. power supply.
   b. horizontal output transformer.
   c. R5.
   d. horizontal output tube.

34. What type of transistor is the video detector? (See diagram 6)

   a. NPP
   b. NPN
   c. PNP
   d. PPN

35. If no collector voltage was present on Q9, what would probably be the problem? (See diagram 6)

   a. R49 open.
   b. R20 open.
   c. R22 open.
   d. R52 open.

77.04.03.08

36. How is sound obtained from the video detector circuit?

   a. video take-off.
   b. sound detector.
   c. 4.5 MHZ trap.
   d. A.G.C.

37. What is the horizontal scan rate of a black and white TV set?

   a. 4.5 MHZ
   b. 60 HZ
   c. 15,750 HZ
   d. 45 MHZ

38. Where should the troubleshooting procedure start with a video problem?

   a. second video amp.
   b video output.
   c. crt.
   d. detector

39. [illegible] se for the tuner and I.F. is taken from the:

   a. R.F. amp.
   b. audio take-off.
   c. video driver.
   d. video output.

77.04.03.08 cont.

40. What will the screen of a color set look like if the video section failed?

    a. normal, but no video.
    b. black.
    c. lit up.
    d. normal, but no audio.

77.04.03.09

41. If the I.F. section of a solid state TV set is working properly, what will appear on the screen when the channel selector is placed between channels?

    a. video.
    b. snow.
    c. interference.
    d. a black picture.

42. Besides detecting video, a video detector is also responsible for another function. What is this other function?

    a. detecting sync.
    b. detecting audio.
    c. clarifying the I.F. signal.
    d. interpreting A.G.C.

43. What device is usually used in modern day TV sets for video detection?

    a. RC circuit.
    b. an oscillator.
    c. capacitor.
    d. germanium diode.

44. Which of the following statements best describes the degree of difficulty in tuning the coils and traps in a video detector circuit?

    a. critical and difficult.
    b. relatively simple.
    c. only difficult at times.
    d. extremely easy.

45. If the first I.F. amp fails in a TV set, the sound and picture will be:

    a. weak.
    b. both [illegible] and strong.
    c. [illegible].
    d. noisy.

77.04.03.10

46. Which section of an I.F. strip in a TV set is the most difficult to troubleshoot?

    a. the detector.
    b. the third I.F.
    c. the first I.F.
    d. the second I.F.

47. Would a transistorized TV set have more I.F. stages than a tube-type TV set?

    a. occasionally.
    b. no.
    c. yes.
    d. possibly.

48. If a TV set displays a fuzzy picture of a loss of detail, what section should the repairman trouble shoot?

    a. video detector.
    b. I.F. amplifiers.
    c. video.
    d. sound take-off.

49. What do the initials "I.F." stand for?

    a. intermediate frequency.
    b. incoming frequency.
    c. in front.
    d. inner frequency.

50. Given the following symptoms, which section should a repairman trouble shoot first? (Distorted raster and video, and a minor buzz in the audio)

    a. video amp.
    b. I.F. amp.
    c. tuner.
    d. A.G.C.

77.04.03.11

51. What is the frequency of the video information being amplified in an I.F. section of a TV set?

    a. 42.17 [illegible]
    b. 45. [illegible]
    c. [illegible]
    d. 41.25 MHZ

77.04.03.11 cont.

52. A defective I.F. section in a TV set will affect:

    a. both audio and video.
    b. raster and audio.
    c. video only.
    d. audio only.

53. What is the frequency of the sound signal being amplified in a video I.F. amp section?

    a. 455 KC
    b. 41.25 MHZ
    c. 42.17 MHZ
    d. 45.75 MHZ

54. What is the frequency of the color burst signal being amplified in a TV video I.F. section?

    a. 45.75 MHZ
    b. 3.58 MHZ
    c. 42.17 MHZ
    d. 41.25 MHZ

55. What type of transistor is used in the I.F. section in figure 6-6? (See diagram 9)

    a. NPN
    b. NNP
    c. PNN
    d. PNP

77.04.03.12

56. What section of an I.F. strip in a TV is the most difficult to trouble shoot?

    a. the detector.
    b. the second I.F.
    c. the third I.F.
    d. the first I.F.

57. If the I.F. section of a solid state TV set is working properly, what will appear on the screen when the channel selector is placed between channels?

    a. v[illegible]
    b. [illegible] picture.
    c. snow.
    d. interference.

58. What is the frequency of the sound signal being amplified in a video I.F. section?

    a. 455 KC
    b. 45.75 MHZ
    c. 41.25 MHZ
    d. 42.17 MHZ

59. A defective I.F. section in a TV set will affect:

    a. audio only.
    b. raster and audio.
    c. video only.
    d. both audio and video.

60. What is the common number of I.F. stages found in American-made TV sets?

    a. two.
    b. four.
    c. three.
    d. five.

77.04.03.13

61. What stage of the tuner is the output of the oscillator connected to?

    a. A.G.C.
    b. first I.F. amp.
    c. R.F. amp.
    d. mixer.

62. If a TV is displaying an excessive amount of snow, what section is probably causing the trouble?

    a. mixer.
    b. first I.F. amp.
    c. oscillator.
    d R.F. amp.

63. What are the two functions of the R.F. amplifier in a TV set?

    a. detects and tunes a signal.
    b. selects and converts a signal.
    c. converts and detects a signal.
    d. selects and amplifies a signal.

64. An [illegible] at [illegible] failure is very similar to the failure of:

    a. the first I.F. amp.
    b. the mixer.
    c. the oscillator.
    d. the third I.F. amp.

65. What type of tuning does a TV set use?

    a. I.F. amp.
    b. fine tuning
    c. TRF
    d. heterodyning.

77.04.03.14

66. What is the predominant symptom when an R.F. amp fails?

    a. interference.
    b. no picture.
    c. snow.
    d. heavy lines.

67. What stage is the R.F. amp signal fed into?

    a. A.G.C.
    b. oscillator.
    c. first I.F. amp.
    d. mixer.

68. If there is weak video and some snow, what stage should the repairman trouble shoot?

    a. oscillator.
    b. R.F. amp.
    c. first I.F. amp.
    d. mixer.

69. What is the difference between an oscillator failure and a video detector problem?

    a. snow.
    b. heavy lines on the screen.
    c. noise in the sound.
    d. no picture.

70. What is the I.F. frequency in a TV?

    a. 455 KC
    b. 46 MHZ
    c. 60 HZ
    d. 15,750

77.04.03.15

71. Almost all UHF tuners in modern day TV sets are:

a. unreliable.
b. tube-type.
c. solid-state.
d. unstable.

72. What is the purpose of the fine tuning coil in this tuner? (See diagram 11)

a. varies the mixer frequency.
b. varies the degree of coupling between the plate and the grid.
c. varies the oscillator frequency.
d. varies the Q of the coil.

73. After leaving the UHF mixer, the signal then goes to the:

a. F oscillator.
b. VHF R.F. amp.
c. F mixer.
d. UHF R.F. amp.

74. If the coils are moved while working on a tuner, the serviceman will:

a. detune the tuner.
b. ruin the tuner.
c. change mixer frequencies.
d. loosen the coils.

75. What device does a UHF tuner use for mixing signals?

a. a diode.
b. a RC circuit.
c. a transistor.
d. a tube.

77.04.03.16

76. What type of tube can be used as a mixer for a tuner?

a. pentode.
b. duo-pentode.
c. diode.
d. triode.

77. What ty[illegible]uning does a TV set [illegible]?

a. I.F. amp.
b. TRF
c. fine tuning.
d. heterodyning.

78. What three stages make up a tuner?

    a. mixer, R.F. amp, and oscillator.
    b. fine tuner, R.F. amp, and detector.
    c. detector, tuning shaft, and mixer.
    d. tuning shaft, oscillator, and detector.

79. What is the frequency between the local oscillator and the R.F. amp?

    a. the I.F. frequency.
    b. 129 MHZ
    c. 83 MHZ
    d. 455 KC

80. Where does the output of the mixer stage of a tuner go?

    a. R.F. amp.
    b. oscillator.
    c. A.G.C.
    d. I.F. strip.

UNIT PRETEST ANSWER KEY: TELEVISION VIDEO SECTION TROUBLES

LAP .01

1. B
2. B
3. D
4. B
5. C

LAP .02

6. D
7. B
8. D
9. D
10. C

LAP .03

11. B
12. B
13. B
14. C
15. B

LAP .04

16. D
17. C
18. D
19. B
20. A

LAP .05

21. B
22. C
23. D
24. D
25. C

LAP .06

26. A
27. B
28. A
29. A
30. B

LAP .07

31. A
32. B
33. B
34. B
35. C

LAP .08

36. C
37. C
38. D
39. C
40. B

LAP .09

41. B
42. B
43. D
44. A
45. A

LAP .10

46. D
47. B
48. B
49. A
50. D

LAP .11

51. D
52. A
53. B
54. C
55. A

LAP .12

56. B
57. C
58. C
59. D
60. C

LAP .13

61. D
62. D
63. D
64. D
65. D

LAP .14

66. C
67. D
68. D
69. C
70. B

LAP .15

71. C
72. C
73. B
74. A
75. A

LAP .16

76. A
77. D
78. A
79. A
80. D

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Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Television Picture Tubes

OBJECTIVE:

Describe the characteristic and functions of the television picture tube.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.
Color-TV Training Manual, Sam's Staff
Photofact Television Course, Sam's Staff

PROCEDURES:

1. Read paragraphs 5-1, Chapter 5 in An Entry Into T.V. Servicing.
2. Answer the review questions 1 thru 10 in Chapter 5.
3. Read Chapter 2 in Photofact Television Course.
4. Answer the questions at the end of the chapter and check your answer with the answer key.
5. Read Chapter 9 in Color-TV Training Manual.
6. Answer the questions at the end of the chapter and check your answers.
7. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ File Code: 77.04.03.01.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: TELEVISION PICTURE TUBES

1. The negative voltage on the grid neutralizes the positive voltage of which element in a crt?

   a. control grid.
   b. second anode.
   c. first anode.
   d. cathode.

2. Where is the second anode of a picture tube located?

   a. the screen.
   b. the bell of the tube.
   c. the neck.
   d. the base.

3. Another name for a picture tube is:

   a. an emitter.
   b. a power tube.
   c. a kinescope.
   d. beam tube.

4. If a TV has a component failure which affects only the video reproduction, the trouble must lie in the picture tube or in the: .

   a. tuner.
   b. video amplifier.
   c. A.G.C.
   d. I.F. amplifier.

5. Electron movement off a cathode is called:

   a. secondary emission.
   b. beam.
   c. emission.
   d. space charge.

6. What happens when the electron beam strikes the phosphor dot on the screen?

   a. it becomes highly positive.
   b. it becomes highly negative.
   c. it glows.
   d. it falls off.

7. What is mounted on the outside of the neck of a black and white crt?

   a. triads.
   b. ion-trap.
   c. yoke.
   d. transformer.

8. What is another name for the heater in a crt?

   a. cathode.
   b. grid.
   c. filament.
   d. anode.

9. Focusing the crt can be accomplished by adjusting the voltage on one of the:

   a. anodes.
   b. cathodes.
   c. grids.
   d. filaments.

10. By controlling the electron beam current, what characteristic of the spot may be varied?

    a. brightness.
    b. contrast.
    c. focus.
    d. position.

LAP TEST ANSWER KEY: TELEVISION PICTURE TUBES

1. C
2. B
3. C
4. B
5. C
6. C
7. C
8. C
9. A
10. A

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Date Published: 12/15/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Normal Sound - No Video

OBJECTIVE:

Given typical symptom(s) or condition(s) commonly related to malfunctions in a television set, identify the video stage(s) in which the trouble can be found.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptoms Diagnosis: Student Response Manual, by Tinnell.
Transistor TV Training Course, by Middleton.

PROCEDURE

Steps

1. Read Lesson #4 in the response manual.
2. Complete the practical exercises at the end of the lesson.
3. Read Chapter 4, "Video Amplifiers" in the Transistor TV Training Course.
4. Answer the questions at the end of the chapter.
5. Check your answers with the answer key.
6. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ **File Code:** 77.04.03.02.A2-2

Date: ______________________ **Date Published:** 11/29/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: NORMAL SOUND--NO VIDEO

1. What kind of coupling usually occurs in the video circuit of a TV set?

   a. transformer.
   b. resistive.
   c. capacitive.
   d. direct.

2. What element is located immediately behind the screen of a color crt?

   a. triads.
   b. aperature mask.
   c. electron guns.
   d. anode.

3. What is the frequency of the sound I.F. in a TV set?

   a. 4.5 KC
   b. 455 KC
   c. 4.5 MHZ
   d. 455 MHZ

4. The signal that carries only picutre information is called:

   a. sync.
   b. I.F. signal.
   c. R.F. signal.
   d. video.

5. The elements that are located in the neck of the picture tube are called:

   a. the controllers.
   b. the electron guns.
   c. the emitters.
   d. the triads.

6. Besides sync, AGC, and video, what else is carried by the video circuit?

   a. con [illegible]
   b [illegible]
   c. brightness.
   d. high voltage.

7. What piece of test equipment is most useful when trouble shooting a video circuit?

   a. B + K analyst.
   b. transistor checker.
   c. oscilloscope.
   d. tube checker.

8. Some TV sets do not have a video driver stage. How does this affect troubleshooting?

   a. makes it easier.
   b. difficult because there is one less stage.
   c. no difference.
   d. makes it more difficult.

9. Which section is the sync pulse taken from?

   a. first video amp.
   b. video output.
   c. contrast control.
   d. AGC

10. The difference between light and dark picture areas is called:

   a. brightness.
   b. a weak crt.
   c. video.
   d. contrast.

LAP TEST ANSWER KEY: NORMAL SOUND--NO VIDEO

1. D
2. B
3. C
4. D
5. B
6. B
7. C
8. A
9. A
10. D

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Symptoms of Normal Sound but No Video

OBJECTIVE:

Determine the television video stage that produces a given symptom or condition.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop #04, Normal Sound But No Video.

Projector

Photofact Television Course, by Middleton.

PROCEDURE:

1. View Film Loop #04 and complete the film loop activities.
2. Check activity answers with the answer key.
3. Read Chapter 15 in the Photofact Television Course.
4. Answer the questions at the end of the chapter.
5. Check your answers with the answer key.
6. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ File Code: 77.04.03.03.A2-2

Date: ______________________ Date Published: 11/29/77

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Glasgow AFB, Montana 59231

LAP TEST: SYMPTOMS OF NORMAL SOUND BUT NO VIDEO

1. What is the purpose of C132 capacitor? (See diagram 4)

   a. filtering.
   b. by-pass.
   c. 35 v source.
   d. coupling.

2. What other signal pulse is taken from the first video amp besides the sync pulse?

   a. horizontal drive pulse.
   b. AGC
   c. brightness.
   d. vertical sync pulse.

3. The cathode in a picture tube can also be called:

   a. a grid.
   b. a heater.
   c. a gun.
   d. an anode driver.

4. What is the purpose of the video bias control?

   a. auxillary brightness control.
   b. frequency control.
   c. regulation of the 80 v.
   d. video amp bias.

5. What test instrument can be used to determine whether any video information is on the grid of a video output tube?

   a. oscilloscope.
   b. B + K analyst.
   c. VTVM
   d. VOM

6. What can a [illegible] ure tube check [illegible] st for besides emission in a crt?

   a. [illegible] leakage.
   b. color emission.
   c. shorts.
   d. aperature mark.

7. What is the first step in troubleshooting either a transistor or tube-type video circuit?

   a. check transistors.
   b. alignment.
   c. replace bad parts.
   d. check voltages.

8. If there is no video, but good audio, what should be the first area to be examined in a TV set?

   a. video driver.
   b. video amp.
   c. the detector.
   d. video output.

9. What type of transistor is Q5, video output? (See diagram 4)

   a. PNN
   b. NPN
   c. A1S
   d. PNP

10. Besides crt, another technical name for a picture tube is a:

   a. kinescope.
   b. screen.
   c. black matrix.
   d. chroma color.

LAP TEST ANSWER KEY: SYMPTOMS OF NORMAL SOUND BUT NO VIDEO

1. A
2. B
3. C
4. D
5. A
6. C
7. D
8. D
9. B
10. A

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File Code: 77.04.03.04.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Normal Sound - No Video

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the video section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Hand tools
Oscilloscope
Soldering & desoldering iron and tools
TSD Trainer
Television Analyst, B & K Model 1077B
Volt-Ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction and verify it with the instructor.
5. After ver[illegible]ic by the in[illegible]tor correct the malfunctio
6. Take [illegible] LA test.

Principal Author(s): R. Arneson/B.Vetter

Student: ______________________ File Code: 77.04.03.04.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: DIAGNOSING NORMAL SOUND--NO VIDEO

1. What piece of test equipment is most useful for troubleshooting a video circuit?

   a. tube checker.
   b. scope.
   c. B + K analyst.
   d. V.O.M.

2. The difference between light and dark areas is called:

   a. brightness.
   b. contrast.
   c. a weak crt.
   d. video.

3. What other element besides the heater, cathode and filament is found in the neck of the picture tube?

   a. second anode.
   b. aquadag.
   c. first anode.
   d. yoke.

4. What can a picture tube checker test for besides emission in a crt?

   a. color emission.
   b. aperature mask.
   c. shorts.
   d. hi-voltage.

5. Besides sync, AGC and video, what else is found in the video circuit?

   a. brightness.
   b. contrast.
   c. sound.
   d. high voltage.

6. What kind of coupling usually occurs in the video circuit of a TV set?

   [illegible]
   b. direct.
   c. capacitive.
   d. transformer.

7. What is the frequency of the sound I.F. in a TV set?

   a. 4.5 KC
   b. 455 KC
   c. 4.5 MHZ
   d. 5 MHZ

8. If a TV set has snow and good sound, but no picture, can this problem be classified as a video problem?

   a. yes.
   b. no.
   c. occasionally.
   d. possibly.

9. The signal that carries only picture information is called:

   a. video.
   b. R.F. signal.
   c. sync.
   d. I.F. signal.

10. What other signal pulse is taken from the first video amp besides the sync pulse?

    a. horizontal drive pulse.
    b. A.G.C.
    c. vertical sync pulse.
    d. brightness.

LAP TEST ANSWER KEY: DIAGNOSING NORMAL SOUND--NO VIDEO

1. B
2. B
3. C
4. C
5. C
6. B
7. C
8. B
9. A
10. B

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File Code: 77.04.03.05.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Troubleshooting Video Failures

OBJECTIVE:

Describe typical symptoms or conditions commonly related to malfunctions in the video amplifier sections of a television set.

EVALUATION PROCEDURE:

Successfully complete at leat 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read paragraph 5-2 through 5-4, Chapter 5 in the above resource.
2. Answer the review questions 11 through 20, Chapter 5.
3. Check answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ **File Code:** 77.04.03.05.A2-2

Date: ______________________ **Date Published:** 11/29/77

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LAP TEST: TROUBLESHOOTING VIDEO FAILURES

1. A crt checker will check everything but:

    a. shorts.
    b. emission.
    c. filament voltage.
    d. high voltage.

2. Which of the following devices most often fails in the video amp circuit?

    a. capacitor.
    b. resistor.
    c. transistor.
    d. tube.

3. The A.G.C. pulse for the tuner and I.F. is taken from the:

    a. video driver.
    b. sound take-off.
    c. R.F. amp.
    d. video output.

4. The gain of the video amplifier depends upon the:

    a. CB alterations within the amp.
    b. time constant of the biasing network.
    c. tube or transistor used.
    d. incoming signal.

5. What will your screen look like in a color set if the video section failed?

    a. black.
    b. lit up.
    c. normal, but no audio.
    d. normal, but no video.

6. In which circuit is the brightness control located?

    a. crt circuitry.
    b. video output.
    c. video amp.
    d. yoke.

7. What is another name for an electron gun?

   a. grid.
   b. first anode.
   c. second anode.
   d. cathode.

8. Which will have more stages of amplification, a tube-type set or a transistor set?

   a. neither.
   b. transistor.
   c. both have the same number.
   d. tube.

9. What would cause a loss of video, but would probably not affect the sound?

   a. A.G.C. failure.
   b. second video failure.
   c. first video failure.
   d. failure in sync separator.

10. How many cathodes does a color picture tube have that is manufactured in the U.S.?

    a. six.
    b. three.
    c. one.
    d. two.

LAP TEST ANSWER KEY: TROUBLESHOOTING VIDEO FAILURES

1. D
2. D
3. A
4. C
5. D
6. B
7. D
8. B
9. B
10. B

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File Code: 77.04.03.06.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: No Sound, No Video, Raster Normal

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a television set, identify the audio and/or video stage(s) in which the trouble is located.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheets.
Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson #5 in the response manual.
2. Complete the Practice Exercises for lesson #5.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ____________________ File Code: 77.04.03.06.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: NO SOUND, NO VIDEO, RASTER NORMAL

1. What is the horizontal scan rate of a black and white TV?
   a. 15,750 HZ
   b. 4.5 MHZ
   c. 60 HZ
   d. 45 MHZ

2. What would be the symptom of weak video on the crt?
   a. distorted sorter.
   b. low contrast.
   c. bent video.
   d. low brightness.

3. The circuit which separates the information signal from the I.F. carrier signal is the:
   a. detector.
   b. video take-off.
   c. sound take-off.
   d. video trap.

4. Turning the A.G.C. control up on a TV will affect video, sound, and:
   a. brightness.
   b. horizontal drive.
   c. sync.
   d. color.

5. What happens to the raster when the contrast control is turned up?
   a. darkens.
   b. brightens.
   c. rolls vertically.
   d. loses sound.

6. Besides losing audio, video, and A.G.C., what else will be lost if the first video amp fails completely?
   a. horizontal drive.
   b. vertical drive.
   c. color.
   d. sync.

7. How is the television able to obtain sound from the picture detector circuit?

   a. sound detector.
   b. 4.5 MHZ trap.
   c. A.G.C.
   d. video take-off.

8. What stage of the video section will affect both sound and picture?

   a. brightness control.
   b. video output.
   c. detector.
   d. contrast control.

9. How is one able to detect an A.G.C. problem when there is no video?

   a. via substitution.
   b. by using a signal generator.
   c. by using a transistor checker.
   d. by using a V.O.M.

10. If there is snow, good sound, but no picture present, will this be classified as a video problem?

    a. no.
    b. yes.
    c. probably.
    d. occasionally.

LAP TEST ANSWER KEY: NO SOUND, NO VIDEO, RASTER NORMAL

1. A
2. B
3. A
4. C
5. B
6. D
7. B
8. C
9. C or D
10. A

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Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Symptoms of No Sound, No Video, Raster Normal

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the video amplifier section of a television set. Record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Black & White Television Diagnosis Sheet.

Film Loop #05, No Sound, No Video, Raster Normal.

Projector.

PROCEDURE:

1. View Film Loop #05 and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): Ron Arneson B. Vetter

Student: ______________________ File Code: 77.04.03.07.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: SYMPTOMS OF NO SOUND, NO VIDEO, RASTER NORMAL

1. What type of transistor is video amp Q4? (See diagram 7)

   a. NPN
   b. NPP
   c. PPN
   d. PNP

2. The video from the video output tube goes to the: (See diagram 8)

   a. picture tube.
   b. G-Y amp.
   c. set-up switch.
   d. R-Y amp.

3. If no collector voltage is present on Q9, what would probably be the problem? (See diagram 6)

   a. R49 open.
   b. R20 open.
   c. R22 open.
   d. R52 open.

4. What affect does the crt bias and brightness have on the video output tube? (See diagram 8)

   a. varies the input bias on the control grid.
   b. varies the amplification of the tube.
   c. varies the cathode voltage.
   d. varies the RC time on R70 and C2.

5. Where does the 132 v boost in the video circuit come from? (See diagram 6)

   a. horizontal output tube.
   b. power supply.
   c. R5
   d. horizontal output transformer.

6. What would [illegible] C15 in the video output shorted out? (See diagram 7)

   a. It would burn up the contrast control.
   b. R48 would open.
   c. R49 would burn up.
   d. the 80 v boast would disappear.

7. If the resistor, R52, burned up, what would be the indication? (See diagram 6)

   a. L7 shorted.
   b. a short in the B+.
   c. shorted video output.
   d. shorted video set.

8. How much voltage drop is there across R62 in the second video amp? (See diagram 8)

   a. 80v.
   b. 100v.
   c. 120 v.
   d. 20v.

9. In this particular circuit, if the contrast control opened, would there be any video? (See diagram 6)

   a. possibly.
   b. yes.
   c. no.
   d. occasionally.

10. What type of transistor is the video detector? (See diagram 6)

   a. NPP
   b. PNP
   c. NPN
   d. PPN

LAP TEST ANSWER KEY: SYMPTOMS OF NO SOUND, NO VIDEO, RASTER NORMAL

1. D
2. C
3. C
4. B
5. D
6. A
7. C
8. A
9. C
10. C

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File Code: 77.04.03.08.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Diagnosing No Sound, No Video, Raster Normal

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the video and audio amplifier section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

B & K Television analyst
Hand tools
Oscilloscope
Soldering & desoldering iron & tools
TSD trainer
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible malfunctions.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction and verify it with the instructor.
5. After verification by the instructor, correct the malfunction.
6. Take the LAP test.

Principal Author(s): R. Arneson B. Vetter

Student: ______________________ **File Code:** 77.04.03.08.A2-2

Date: ______________________ **Date Published:** 11/29/77

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LAP TEST: DIAGNOSING NO SOUND, NO VIDEO, RASTER NORMAL

1. How can an A.G.C. problem be detected when there is no video?

   a. by using a signal generator.
   b. by using a scope.
   c. by using a tube checker.
   d. through substitution.

2. Which of the following devices most often fails in the video amp circuit?

   a. tube.
   b. transistor.
   c. resistor.
   d. capacitor.

3. How is sound obtained from the video detector circuit?

   a. 4.5 MHZ trap.
   b. video take-off.
   c. A.G.C.
   d. sound detector.

4. What would weak video look like on a crt?

   a. distorted raster.
   b. low brightness.
   c. low contrast.
   d. bent video.

5. Where should the troubleshooting procedure start with a video problem?

   a. video output.
   b. crt.
   c. second video amp.
   d. detector.

6. The A.G.C. pulse for the tuner and I.F. is taken from the:

   a. R.F amp
   b. video amp
   c. video output.
   d. audio take-off.

7. What section of a TV should not affect the video?

   a. audio.
   b. power supply.
   c. video driver.
   d. contrast control.

8. What is the horizontal scan rate of a black and white TV set?

   a. 45 MHZ
   b. 60 HZ
   c. 4.5 MHZ
   d. 15,750 HZ

LAP TEST ANSWER KEY: DIAGNOSING NO SOUND, NO VIDEO, RASTER NORMAL

1. B
2. A
3. A
4. C
5. A
6. B
7. A
8. D

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File Code: 77.04.03.09.A2-0

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Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Picture I-F Problems

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the video I-F Section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCE:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.
Transistor TV Training Course, by Middleton.

PROCEDURE:

1. Read Chapter 6 in the resource "Entry Into TV Servicing".
2. Answer the review questions at the end of the chapter.
3. Check your answers with the answer key.
4. Read Chapter 3, "Video I-F and Detector Sections" in the Transistor TV Training Course.
5. Answer the review questions at the end of Chapter 3.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): R. Arneson/B. Vetter

Student: ______________________ File Code: 77.04.03.09.A2-2

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LAP TEST: PICTURE I-F PROBLEMS

1. What should be viewed on the screen with a malfunctioning I.F. amp and the contrast turned up all the way?

   a. heavy snow.
   b. light snow.
   c. no picture whatsoever.
   d. severe interference.

2. What is the common number of I.F. stages found in American-made TV sets?

   a. two.
   b. five.
   c. three.
   d. four.

3. When the sound I.F. is taken off the first video stage, where is the sound trap then placed?

   a. in the I.F. section itself.
   b. between the first and second video amplifiers.
   c. after the second video amp.
   d. after the video output.

4. When troubleshooting a television I.F. section, what other section can be considered a part of the I.F.?

   a. vertical deflection.
   b. video detector.
   c. A.G.C.
   d. sync section.

5. If the I.F. section of a solid state TV set is working properly, what will appear on the screen when the channel selector is placed between channels?

   a. a black picture.
   b. snow.
   c. interference.
   d. video.

6. If the first I.F. amp fails in a TV set, the sound and picture will be:

   a. strong.
   b. both noisy and strong.
   c. noisy.
   d. weak.

7. A failure in the I.F. section of a TV set will affect:

   a. the sync.
   b. the sound only.
   c. both the sound and the picture.
   d. the picture only.

8. A good method to isolate trouble to the I.F. section is to:

   a. replace the first I.F. amp.
   b. replace the second I.F. amp.
   c. vary the contrast control.
   d. replace the video detector.

9. Besides detecting video, a video detector is also responsible for another function. What is this other function?

   a. detecting sync.
   b. clarifying the I.F. signal.
   c. interpreting A.G.C.
   d. detecting audio.

10. When the video detector fails in a TV set, it gives you the same symptom as a:

    a. malfunctioning first I.F. amp.
    b. malfunctioning sound take-off transformer.
    c. malfunctioning second I.F. amp.
    d. malfunctioning third I.F. amp.

LAP TEST ANSWER KEY: PICTURE I-F PROBLEMS

1. B
2. C
3. B
4. B
5. B
6. D
7. C
8. C
9. D
10. D

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Date Published: 12/15/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: I-F Amplifier Troubles

OBJECTIVE:

Given typical symptoms related to malfunctions in a television set, identify the Video-IF stage in which the trouble exists.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.
Photofact Television Course, by E. Staff of Sam's.

PROCEDURE:

1. Read Lesson 6 in the response manual.
2. Complete the Practice Exercises for Lesson 6.
3. Check your answers with the answer key.
4. Read Chapter 13, "Video I-F Amplifers and Detectors" in the Photofact Television Course.
5. Answer the questions at the end of Chapter 6.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): R. Arneson B. Vetter

Student: ______________________ File Code: 77.04.03.10.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: I-F AMPLIFIER TROUBLES

1. Where does the I.F. amp of a TV set receive its signal?

   a. tuner.
   b. A.G.C
   c. second I.F. amp.
   d. video detector.

2. If a TV set displays a fuzzy picture or a loss of detail, what section should the repairman troubleshoot?

   a. sound take-off.
   b. video detector.
   c. video.
   d. I.F. amplifiers.

3. Would a transistorized TV set have more I.F. stages than a tube-type TV set?

   a. occasionally.
   b. yes.
   c. no.
   d. possibly.

4. When the last I.F. amplifier fails in a TV set, it will affect:

   a. just video.
   b. the A.G.C.
   c. just sound.
   d. both sound and picture.

5. If you have normal video but no audio, which section should the repairman troubleshoot first?

   a. audio.
   b. second I.F. amp.
   c third I.F. section.
   d. video.

6. What [illegible] th [illegible] "I.F." [illegible] for?

   a. incoming frequency.
   b. intermediate frequency.
   c. in front.
   d. inner frequency.

7. When a partial failure occurs in an I.F. amp stage, it will cause low contrast and:

   a. weak vertical sync.
   b. poor A.G.C.
   c. low brightness.
   d. weak horizontal sync.

8. Given the following symptoms, which section should a repairman troubleshoot first? (Distorted raster and video, and a minor buzz in the audio)

   a. A.G.C.
   b. video amp.
   c. I.F. amp.
   d. tuner.

9. If a TV set displays multiple ghosts, what should the repairman troubleshoot?

   a. video I.F. amps.
   b. antenna.
   c. video detector.
   d. tuner.

10. Which piece of test equipment should be used when checking an I.F. section of a TV set?

   a. an ohmmeter.
   b. a voltmeter.
   c. a tube checker.
   d. a B + K analyst.

LAP TEST ANSWER KEY: I.F. AMPLIFIER TROUBLES

1. A
2. D
3. C
4. D
5. A
6. B
7. A
8. A
9. B
10. B

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File Code: 77.04.03.11.A2-0

Date Published: 12/15/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY. A Defective I-F Amplifier

OVJECTIVE:

Observe typical symptoms commonly related to malfunctions in the video I-F amplifier section of a television set. Record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop #06, A Defective I-F Amplifier.

Projector

PROCEDURE:

1. View Film Loop #06 and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): R. Arneson B. Vetter

Student: ____________________ File Code: 77.04.03.11.A2-2

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LAP TEST: A DEFECTIVE I-F AMPLIFIER

1. What is the frequency of the video information being amplified in an I.F. section of a TV set?
    a. 42/17 MHZ
    b. 46 MHZ
    c. 45.75 MHZ
    d. 41.25 MHZ

2. What measurement is taken at T.P. 3B? (See diagram 9)
    a. collector voltage of second I.F. amp.
    b. resonant frequency of that transformer.
    c. base voltage of the second I.F. amp.
    d. emitter voltage of the second I.F. amp.

3. On test point 21, where do the 330 volts come from? (Diagram 10)
    a. A.G.C.
    b. plate of V2.
    c. grid of V2.
    d. power supply.

4. What type of transistor is used in the I.F. section? (See diagram 9)
    a. PNP
    b. PNN
    c. NNP
    d. NPN

5. The picture I.F. amplifier must amplify a band of signal frequencies from about 41 MHZ up to about:
    a. 45.75 MHZ
    b. 41.25 MHZ
    c. 46 MHZ
    d. 15,750 MHZ

6. The proper [illegible] for the diagram for the lower right hand figure is: (See diagram [illegible])
    a. an I.F. response curve.
    b. generator frequency.
    c. third I.F. tuning.
    d. % of modulation present.

7. What is the frequency of the color burst signal being amplified in a TV video I.F. section?

   a. 42.17 MHZ
   b. 41.25 MHZ
   c. 3.58 MHZ
   d. 45.75 MHZ

8. If the 680 ohm resistor in the collector circuit of Q3B is getting hot, what component should the repairman replace? (See diagram 9)

   a. 90015 capacitor.
   b. Q3B transistor.
   c. 680 ohm resistor.
   d. 390 ohm resistor.

9. What is the frequency of the sound signal being amplified in a video I.F. amp section?

   a. 41.25 MHZ
   b. 45.75 MHZ
   c. 42.17 MHZ
   d. 455 KC

10. When troubleshooting an I.F. section of a tube-type TV set, what is the first step the repairman should take?

    a. check the voltage.
    b. substitute the tubes.
    c. make resistance measurements.
    d. check for proper capacitance coupling.

LAP TEST ANSWER KEY: A DEFECTIVE I-F AMPLIFIER

1. C
2. A
3. D
4. D
5. C
6. A
7. A
8. B
9. A
10. B

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Diagnosing I-F Amplifier Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the video I-F amplifier section of a television set.

EVALUATION PROCEDURE:

Diagnosis and repairs are evaluated on a unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst, B & K Division of Dynascan Corp.

Hand tools
Oscilloscope
Soldering & desoldering iron and tools
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.

2. Read "I.F. Signal", page 20, in Instruction Manual for Model 1077 Television Analyst.

3. Diagnose the receiver using the television analyst.

Principal Author(s): R. Arneson & B. Vetter

Student: ______________________ File Code: 77.04.03.12.A2-2

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LAP TEST: DIAGNOSING I-F AMPLIFIER TROUBLES

1. What section of an I.F. strip in a TV is the most difficult to troubleshoot?

   a. the detector.
   b. the first I.F.
   c. the second I.F.
   d. the third I.F.

2. Besides detecting video, a video detector is also responsible for another function. What is this other function?

   a. interpreting A.G.C.
   b. detecting audio.
   c. detecting sync.
   d. clarifying the I.F. signal.

3. When a partial failure occurs in an I.F. amp stage, it will cause low contrast and:

   a. weak horizontal sync.
   b. poor A.G.C.
   c. low brightness.
   d. weak vertical sync.

4. A defective I.F. section in a TV set will affect:

   a. both audio and video.
   b. video only.
   c. raster and audio.
   d. audio only.

5. When the sound I.F. is taken off the first video stage, where is the sound trap placed?

   a. between the first and second video amplifiers.
   b. between the video detector and the first video amplifier.
   c. between the second and third video amplifiers.
   d. between the second video amplifier and the crt.

6. What pieces of test equipment should be used to align the I.F. section of a TV set?

   a. an audio generator and scope.
   b. a signal generator and scope.
   c. a sweep generator and marker.
   d. a signal generator and V.O.M.

7. Where does the I.F. amp of a TV set obtain its signal?

    a. from the second I.F. amp.
    b. from the tuner.
    c. from the A.G.C.
    d. from the video detector.

8. Would a solid-state TV have more I.F. stages than a tube-type set?

    a. occasionally.
    b. possibly.
    c. yes.
    d. no.

9. When troubleshooting a TV's I.F. section, what other section can be considered a part of the I.F.?

    a. the vertical deflection.
    b. the video detector.
    c. the sync section.
    d. the A.G.C.

10. If the I.F. section of a solid state TV set is working properly, what will appear on the screen when the channel selector is placed between channels?

    a. snow.
    b. interference.
    c. a black picture.
    d. video.

LAP TEST ANSWER KEY: DIAGNOSING I-F AMPLIFIER TROUBLES

1. C
2. B
3. D
4. A
5. A
6. C
7. B
8. D
9. B
10. A

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Mountain-Plains Education &
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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Tuner Troubles

OBJECTIVE:

Describe typical symptoms or conditions commonly related to malfunctions in the tuner of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptoms Diagnosis: An Entry Into T.V. Servicing, Tinnell.
Photofact Television Course by Sam's Ed. Staff.

Procedure;

1. Read Chapter 7 in An Entry into T.V. Servicing.
2. Answer the review questions at the end of chapter 7.
3. Check your answers with the answer key.
4. Read Chapter 12, "Tuners", in Photofact Television Course.
5. Answer the questions at the end of chapter 12.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): R. Arneson & B. Vetter

Student: ______________________ File Code: 77.04.03.13.A2-2

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LAP TEST: TUNER TROUBLES

1. An oscillator failure is very similar to the failure of:

   a. the mixer.
   b. the first I.F. amp.
   c. the third I.F. amp.
   d. the oscillator.

2. The oscillator signal is mixed with R.F. amp signal to produce:

   a. the video signal.
   b. the mixer signal.
   c. the I.F. signal.
   d. the audio signal.

3. When an R.F. stage fails in a tuner, its symptom will be very similar to:

   a. a first I.F. amp failure.
   b. an oscillator failure.
   c. a second I.F. amp failure.
   d. a mixer failure.

4. What are the three functions of a TV set's tuner?

   a. fine tune the audio, select the desired channel and amplify the R.F.
   b. fine tune the audio, select the color and select the desired channel.
   c. amplify the R.F. signal to the I.F. frequency and supply A.G.C.
   d. select the desired channel, amplify the R.F. signal and convert the signal to the I.F. frequency.

5. In a TV set's tuner, what is the source of snow?

   a. mixer.
   b. R.F. amp.
   c. I.F. amp.
   d. oscillator.

6. What type of tuning does a TV set use?

   a. I.[illegible] an
   b. het rod[illegible].
   c. fine tuning.
   d. TRF

7. What three stages make up a tuner?

   a. tuning shaft, oscillator, and detector.
   b. mixer, R.F. amp, and oscillator.
   c. fine tuner, R.R. amp, and detector.
   d. detector, tuning shaft, and mixer.

8. What stage of the tuner is the output of the oscillator connected to?

   a. A.G.C.
   b. first I.F. amp.
   c. mixer.
   d. R.F. amp.

9. If a TV is displaying an excessive amount of snow, what section is probably causing the trouble?

   a. oscillator.
   b. R.F. amp.
   c. first I.F. amp.
   d. mixer.

10. What are the two functions of the R.F. amplifier in a TV set?

    a. selects and converts a signal.
    b. converts and detects a signal.
    c. detects and tunes a signal.
    d. selects and amplifies a signal.

LAP TEST ANSWER KEY: TUNER TROUBLES

1.	C
2.	C
3.	D
4.	D
5.	D
6.	B
7.	B
8.	C
9.	B
10.	D

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Identifying Tuner Problems

OBJECTIVE:

Given typical symptoms related to malfunctions in a television set. Identify the tuner circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptoms Diagnosis: Student Response Manual, Tinnell.
Transistor TV Training Course by Middleton.

PROCEDURE:

1. Read Lesson #7 in the response manual.
2. Complete the Practice Exercises for Lesson 7.
3. Check your answers with the answer key.
4. Read Chapter 2, "Tuners", in the Transistor TV Training Course.
5. Answer the review questions at the end of Chapter 2.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): R. Arneson & R. Vetter

Student: ______________________ File Code: 77.04.03.14.A2-2

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LAP TEST: IDENTIFYING TUNER PROBLEMS

1. What is the frequency difference between the local oscillator and the R.F. amp?

   a. the I.F. frequency.
   b. 129 MHZ
   c. 83 MHZ
   d. 455 KC

2. What is the I.F. frequency in a TV?

   a. 60 HZ
   b. 46 MHZ
   c. 15,750 HZ
   d. 455 KC

3. Why is it necessary to have a feedback circuit in a tuner oscillator circuit?

   a. for self-bias.
   b. to keep it running.
   c. to prevent frequency drift.
   d. to determine what frequency it will operate on.

4. What channels are in the VHF spectrum?

   a. 14-84.
   b. 2-19.
   c. 2-13.
   d. 7-17.

5. Where does the output of the mixer stage of a tuner go?

   a. A.G.C.
   b. R.F. amp.
   c. I.F. strip.
   d. oscillator.

6. How is the oscillator kept on frequency in a tuner?

   a. high grade tubes.
   b. fine tuner.
   c. crystal oscillator.
   d. constant alignment.

7. What is the difference between an oscillator failure and a video detector problem?

   a. no picture.
   b. noise in the sound.
   c. heavy lines on the screen.
   d. snow.

8. The UHF tuner is connected to the:

   a. oscillator.
   b. R.F. amp.
   c. first I.F. amp.
   d. mixer.

9. What do the initials "F.E.T." stand for?

   a. a specific type of R.F. amp.
   b. field effect transistor.
   c. field evaluation technique.
   d. field engineer technician.

10. Where are the R.F. and oscillator signals combined?

   a. oscillator.
   b. second I.F. amp.
   c. first I.F. amp.
   d. mixer.

LAP TEST ANSWER KEY: IDENTIFYING TUNER PROBLEMS

1. A
2. B
3. B
4. C
5. C
6. B
7. B
8. B
9. B
10. D

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: A Defective Tuner

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the tuner of a television set. Record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop #07, A Defective Tuner.

Projector

PROCEDURE:

1. View Film Loop #07 and complete the film loop activities.
2. Check your activity answer with the answer key.
3. Take the LAP test.

Principal Author(s): R. Arneson & B. Vetter

Student: ______________________ File Code: 77.04.03.15.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: A DEFECTIVE TUNER

1. What is the proper title for the L201 coil in the antenna board? (See diagram 11)

   a. balun coil.
   b. matching bridge.
   c. input circuit.
   d. fixed transformer.

2. The UHF tuner converts the UHF frequency to:

   a. 455 KC
   b. 41.25 MC
   c. VHF
   d. MHZ

3. What channel is the tuner set on? (See diagram 11)

   a. 10.
   b. 11.
   c. 12.
   d. 13.

4. After leaving the UHF mixer, the signal then goes to the:

   a. VHF R.F. amp.
   b. UHF R.F. amp.
   c. F mixer.
   d. F oscillator.

5. What are the three main parts of a local oscillator in a TV set?

   a coupling coil, amplifying device, and a tuned circuit.
   b. resonant RL circuit, tuned circuit, and a feedback circuit.
   c. RLC circuit, coupling coil, and a resonant RL circuit.
   d. feedback circuit, tuned circuit, and amplifying device.

6. What is the purpose of the fine tuning coil in this tuner? (See diagram 11)

   a. varies the oscillator frequency.
   b. varies degree of coupling between the plate and the grid.
   c. varies the Q of the coil.
   d. varies the mixer frequency.

7. Almost all UHF tuners in modern day TV sets are:

   a. solid-state.
   b. tube-type.
   c. unreliable.
   d. unstable.

8. What controls the B+ voltage to UHF tuner?

   a. a transistor.
   b. the power supply.
   c. a switch on the VHF tuner.
   d. a switch in the I.F. amp.

9. If the coils are moved while working on a tuner, the serviceman will:

   a. loosen the coils.
   b. ruin the tuner.
   c. detune the tuner.
   d change mixer frequencies.

10. What type of tube can be used as a mixer for a tuner?

   a. diode.
   b. triode.
   c. pentode.
   d. duo-pentode.

LAP TEST ANSWER KEY: A DEFECTIVE TUNER

1. A
2. C
3. D
4. A
5. D
6. A
7. A
8. C
9. C
10. C

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Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Tuner Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the tuner of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on a unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst, B & K Division of Dynascan Corp.
Motorola CTV5L Trainer Manual
Hand tools
Soldering and desoldering iron and tools
TSD Trainer or television set
Volt-ohmmeter
Video Tape recorder and monitor
Video Tape "Tuner Identification and Repair".

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Read "VHF Signal", pages 12-13, and "Basic Signal Substitution Techniques", pages 49-51 in Instruction Manual for Model 1077 Television Analyst.
3. Remove the tuner from the TSD Trainer using the trainer manual and hand tools.
4. [illegible] the film "Tuner Identification and Repair" which is obtained from the instructor.
5. Replace the tuner back into the trainer when completed with the film loop.
6. Take the LAP test.

Note: The set must function properly when completed with this LAP.

Student: ______________________ File Code: 77.04.03.16.A2-2

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LAP TEST: DIAGNOSING TUNER TROUBLES

1. If a TV is displaying an excessive amount of snow, what section is probably causing the trouble?

   a. mixer.
   b. oscillator.
   c. first I.F. amp.
   d. R.F. amp.

2. When a R.F. stage fails in a tuner, its symptom will be similar to:

   a. first I.F. amp failure.
   b. an oscillator failure.
   c. a mixer failure.
   d. a second I.F. amp failure.

3. Where does the output of the mixer stage of a tuner go?

   a. I.F. strip.
   b. oscillator.
   c. A.G.C.
   d. R.F. amp.

4. What type of tube can be used as a mixer for a tuner?

   a. triode.
   b. pentode.
   c. diode.
   d. duo-pentode.

5. What type of tuning does a TV set have?

   a. I.F. amp.
   b. fine tuning.
   c. TRF.
   d. heterodyning.

6. An oscillator failure is very similar to the failure of the:

   a. third I.F. amp.
   b. oscillator.
   c. first I.F. amp.
   d. mixer.

7. The UHF tuner converts the UHF frequency to:

   a. 455 KC
   b. 41.25 MC
   c. VHF
   d. 46 MHZ

8. What device does a UHF tuner use for mixing signals?

   a. a transistor.
   b. a tube.
   c. a RC circuit.
   d. a diode.

9. What three stages make up a tuner?

   a. fine tuner, R.F. amp, and detector.
   b. detector, tuning shaft, and mixer.
   c. mixer, R.F. amp, and oscillator.
   d. tuning shaft, oscillator, and detector.

10. Why is it necessary to have a feedback circuit in a tuner oscillator circuit?

    a. to maintain frequency drift.
    b. to determine what frequency it will operate on.
    c. to keep it running.
    d. for self-bias.

LAP TEST ANSWER KEY: DIAGNOSING TUNER TROUBLES

1. D
2. C
3. A
4. B
5. D
6. A
7. C
8. D
9. C
10. C

Student: ______________________ File Code: 77.04.03.00.B2-2

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UNIT POST TEST: TLEVISION VIDEO SECTION TROUBLES

77.04.03.01

1. What are the colors found on the screen of a color crt?
   - a. blue, green, and yellow.
   - b. blue, green, and orange.
   - c. red, blue, and green.
   - d. red, green, and yellow.

2. Electron movement off a cathode is called:
   - a. emission.
   - b. secondary emission.
   - c. beam.
   - d. space charge.

3. Focusing the crt can be accomplished by adjusting the voltage on one of the:
   - a. grids.
   - b. anodes.
   - c. filaments.
   - d. cathodes.

4. What attracts the electrons toward the screen of the picture tube?
   - a. cathode.
   - b. phosphor coating.
   - c. magnetic field.
   - d. the second anode.

5. What other element besides the heater, cathode, and filament are found in the neck of a CRT?
   - a. first anode.
   - b. second anode.
   - c. yoke.
   - d. a[illegible]ada

77.04.03.02

6. What is the frequency of the sound I.F. in a TV set?

    a. 455 MHZ
    b. 4.5 MHZ
    c. 455 KC
    d. 4.5 KC

7. Which section is the sync pulse taken from?

    a. A.G.C.
    b. contrast control.
    c. first video amp.
    d. video output.

8. The device which is used to check the emission of a picture tube is called:

    a. a V.O.M.
    b. an oscilloscope.
    c. a hi-voltage probe.
    d. a crt checker.

9. What kind of coupling usually occurs in the video circuit of a TV set?

    a. capacitive.
    b. resistive.
    c. transformer.
    d. direct.

10. Some TV sets do not have a video driver stage. How does this affect trouble shooting?

    a. makes it easier.
    b. makes it more difficult.
    c. difficult because there is one less stage.
    d. no difference.

77.04.03.03

11. What is the purpose of C132 capacitor? (See diagram 4)

    a. filtering.
    b. by-pass.
    c. 35 v source.
    d. coupling.

12. The cathode of a picture tube can also be called:

    a. a gun.
    b. an anode driver.
    c. a heater.
    d. a grid.

77.04.03.03 cont.

13. What test instrument can be used to determine whether any video information is on the grid of a video output tube?

    a. B + K analyst.
    b. oscilloscope.
    c. vom
    d. VTVM

14. What can a picture tube checker test for besides emission in a crt?

    a. color emission.
    b. hi-voltage.
    c. shorts.
    d. aperature mask.

15. What is the purpose of the diode, E100, in this set? (See diagram 4)

    a. zenier diode.
    b. audio detector.
    c. bias regulator.
    d. video detector.

77.04.03.04

16. If there is no video, but good audio, what should be the first area to be checked?

    a. the detector.
    b. the video amp.
    c. the video driver.
    d. the video output.

17. The cathode in a picture tube can also be called:

    a. a heater.
    b. an anode driver.
    c. a gun.
    d. a grid.

18. The signal that carries only picture information is called:

    a. R.F. signal.
    b. video.
    c. sync.
    d. I.F. signal.

19 The difference between light and dark areas is called:

    a. brightness.
    b. video.
    c. a weak crt.
    d. contrast.

20. What kind of coupling usually occurs in the video circuit of a TV set?

    a. transformer.
    b. direct.
    c. resistive.
    d. capacitive.

77.04.03.05

21. If the video output base voltage is o.k., but no video is present, the next stage to look would be:

    a. yoke.
    b. second video amp.
    c. first video amp.
    d. crt.

22. What would cause a loss of video, but would probably not affect the sound?

    a. second video failure.
    b. A.G.C. failure.
    c. failure in sync separator.
    d. first video failure.

23. Which of the following devices most often fails in the video amp circuit?

    a. resistor.
    b. capacitor.
    c. transistor.
    d. tube.

24. The difference between light and dark on the screen of a TV is defined as:

    a. contrast.
    b. sync.
    c. brightness.
    d. emission.

25. The gain of the video amplifier depends upon the:

    a. time constant of the biasing network.
    b. tube or transistor used.
    c. incoming signal.
    d. CB alterations within the amp.

77.04.03.06

26. What section of a TV should not affect the video?

    a. video driver.
    b. audio.
    c. power supply.
    d. contrast control.

27. What affect does the yoke have on the video signals?

    a. some, but only in color.
    b. a great deal.
    c. none.
    d. some.

28. What stage of the video section will affect both sound and picture?

    a. video output.
    b. brightness control.
    c. detector.
    d. contrast control.

29. How is one able to obtain sound from the picture detector circuit?

    a. 4.5 MHZ trap.
    b. sound detector.
    c. A.G.C.
    d. video take-off.

30. What is the horizontal scan rate of a black and white TV?

    a. 60 HZ
    b. 4.5 MHZ
    c. 15,750 HZ
    d. 45 MHZ

77.04.03.07

31. What would happen if C15 in the video output shorted out? (See diagram 7)

    a. the 80 v boast would disappear.
    b. R49 would burn up.
    c. it would burn up the contrast control.
    d. R48 would open.

32. In this particular circuit, if the contrast control opened, would there be any video? (See diagram 6)

    a. occasionally.
    b. no.
    c. yes.
    d. possibly.

33. Does the color gain control have any affect on the video? (See diagram 8)

    a. occasionally.
    b. yes.
    c. no.
    d. possibly.

34. What affect does the crt bias and brightness have on the video output tube? (See diagram 8)

    a. varies the RC time on R70 and C2.
    b. varies the input bias on the control grid.
    c. varies the cathode voltage.
    d. varies the amplification of the tube.

35. What type of transistor is video amp Q4? (See diagram 7)

    a. PNP
    b. PPN
    c. NPN
    d. NPP

77.04.03.08

36. What section of a TV should not affect the video?

    a. power supply.
    b. contrast control.
    c. video driver.
    d. audio.

37. A crt checker will check everything but:

    a. high voltage.
    b. emission.
    c. shorts.
    d filament voltage.

38. How can an A.G.C. problem be detected when there is no video?

    a. through substitution.
    b. by using a V.O.M.
    c. by using a signal generator.
    d. by using a scope.

77.04.03.08 cont.

39. The circuit which separate the video information signal from the I.F. carrier signal is the:

    a. video trap.
    b. video take-off.
    c. sound take-off.
    d. detector.

40. Which of the following devices most often fails in the video amp circuit?

    a. tube.
    b. transistor.
    c. capacitor.
    d. resistor.

77.04.03.09

41. When the video detector fails in a TV set, it gives you the same symptom as a:

    a. malfunctioning third I.F. amp.
    b. malfunctioning sound take-off transformer.
    c. malfunctioning second I.F. amp.
    d. malfunctioning first I.F. amp.

42. When the sound I.F. is taken off the first video stage, where is the sound trap then placed?

    a. after the video output.
    b. in the I.F. section itself.
    c. after the second video amp.
    d. between the first and second video amplifiers.

43. What is the common number of I.F. stages found in American-made TV sets?

    a. three.
    b. four.
    c. five.
    d. two.

44. What is the main purpose of a sound trap in a TV set?

    a. prevents the video information from entering the sound stages.
    b. prevents damage to the third I.F. stage.
    c. prevents the sound I.F. signal from entering the video amp.
    d. prevents damage to the video detector.

45. What should be viewed on the screen with a malfunctioning I.F. amp and the contrast turned up all the way?

    a. no picture whatsoever.
    b. light snow.
    c. heavy snow.
    d. severe interference.

77.04.03.10

46. If you have normal video but no audio, which section should the repairman trouble shoot first?

    a. third I.F. section.
    b. audio.
    c. second I.F. amp.
    d. video.

47. Which piece of test equipment should be used when checking an I.F. section of a TV set?

    a. a voltmeter.
    b. an oscilloscope.
    c. a B + K analyst.
    d. an ohmmeter.

48. What is the predominant indication of a first I.F. amp failure?

    a. a blank picture.
    b. snow.
    c. color bars.
    d. interference.

49. Where does the I.F. amp of a TV set get its signal?

    a. tuner.
    b. second I.F. amp.
    c. A.G.C.
    d. video detector.

50. When a partial failure occurs in an I.F. amp stage, it will cause low contrast and:

    a. weak horizontal sync.
    b. weak vertical sync.
    c. poor A.G.C.
    d. low brightness.

77.04.03.11

51. The dotted line surrounding L5 transformer in figure 6-7 means: (See diagram 10)

    a. it is an optional device.
    b. it is enclosed in a metal container.
    c. it is [illegible]ecial transformer which requires special tuning.
    D. it is [illegible]d only in specific chassis.

52. Referring to figure 6-6, if the 680 ohm resistor in the collector circuit of Q38 is getting hot, what component should the repairman replace? (See diagram 9)

    a. Q3B transistor.
    b. 390 ohm resistor.
    c. .0015 capacitor.
    d. 680 ohm resistor.

53. On test point 21, where does the 330 volts come from? (See diagrams 9 and 10)

    a. power supply.
    b. plate of V2.
    c. A.G.C.
    d. grid of V2.

54. When troubleshooting an I.F. section of a tube-type TV set, what is the first step the repairman should take?

    a. check for proper capacitance coupling.
    b. check the voltage.
    c. make resistance measurements.
    d. substitute the tubes.

55. In figure 6-6, what measurement is taken at T.P. 3B? (See diagram 9)

    a. collector voltage of second I.F. amp.
    b. emitter voltage of the second I.F. amp.
    c. base voltage of the second I.F. amp.
    d. resonant frequency of that transformer.

77.04.03.12

56. Would a solid-state TV have more I.F. stages than a tube-type set?

    a. no.
    b. possibly.
    c. yes.
    d. occasionally.

57. What pieces of test equipment should be used to align the I.F. section of a TV set?

    a. an audio generator and scope.
    b. a sweep generator and marker.
    c. a signal generator and scope.
    d. a signal generator and V.O.M.

58. When the sound I.F. is taken off the first video stage, where is the sound trap placed?

    a. between the second video amplifier and the crt.
    b. between the video detector and the first video amplifier.
    c. between the second and third video amplifiers.
    d. between the first and second video amplifiers.

59. If a TV set displays a fuzzy picture and a loss of detail, what section should be checked?

    a. sound take-off.
    b. I.F. amp.
    c. video.
    d. video detector.

60. What do the initials "I.F." stand for?

    a. intermediate frequency.
    b. incoming frequency.
    c. inner frequency.
    d. in front.

77.04.03.13

61. The oscillator signal is mixed with R.F. amp signal to produce:

    a. the audio signal.
    b. the mixer signal.
    c. the I.F. signal.
    d. the video signal.

62. When an R.F. stage fails in a tuner, its symptom will be very similar to:

    a. an oscillator failure.
    b. a first I.F. amp failure.
    c. a mixer failure.
    d. a second I.F. amp failure.

63. When troubleshooting an R.F. problem, what other section should the repairman be troubleshooting at the same time?

    a. the mixer.
    b. the first I.F. amp.
    c. the antenna.
    d. the oscillator.

64 What part [illegible] tuner is the antenna associated with?

    a. detector.
    b. oscillator.
    c. mixer.
    d. R.F. amp.

77.04.03.13 cont.

65. What three stages make up a tuner?

    a. tuning shaft, oscillator, and detector.
    b. fine tuner, R.R. amp, and detector.
    c. detector, tuning shaft, and mixer.
    d. mixer, R.F. amp, and oscillator.

77.04.03.14

66. Where does the output of the mixer stage of a tuner go?

    a. R.F. amp.
    b. A.G.C.
    c. I.F. strip.
    d. oscillator.

67. The UHF tuner is connected to the:

    a. R.F. amp.
    b. mixer.
    c. oscillator.
    d. first I.F. amp.

68. How is the oscillator kept on frequency in a tuner?

    a. crystal oscillator.
    b. high grade tubes.
    c. fine tuner.
    d. constant alignment.

69. What is the frequency difference between the local oscillator and the R.F. amp?

    a. 455 KC
    b. the I.F. frequency.
    c. 83 MHZ
    d. 129 MHZ

70. What do the initials "F.E.T." stand for?

    a. field engineer technician.
    b. a specific type of R.F. amp.
    c. field effect transistor.
    d. field evaluation technique.

77.04.03.15

71. What are the three main parts of a local oscillator in a TV set?

    a. RLC circuit, coupling coil, and a resonant RL circuit.
    b. resonant RL circuit, tuned circuit, and a feedback circuit.
    c. coupling coil, amplifying device, and a tuned circuit.
    d. feedback circuit, tuned circuit, and amplifying device.

72. What is the proper title for the L201 coil in the antenna board? (See diagram 11)

    a. matching bridge.
    b. fixed transformer.
    c. input circuit.
    d. balun coil.

73. Where does the signal go after leaving the UHF oscillator?

    a. UHF R.F. amp.
    b. UHF mixer.
    c. F I.F. amp.
    d. F mixer.

74. What channel is the tuner set on? (See diagram 11)

    a. 13
    b. 10
    c. 11
    d. 12

75. What controls the B+ voltage to UHF tuner?

    a. a switch on the VHF tuner.
    b. the power supply.
    c. a transistor.
    d. a switch in the I.F. amp.

77.04.03.16

76. An oscillator failure is very similar to the failure of the:

    a. first I.F. amp.
    b. third I.F. amp.
    c. mixer.
    d. oscillator.

77. The UHF tuner converts the UHF frequency to:

    a. 455 KC
    b. 49.50 MHZ
    c. 41.25 MC
    d. VHF

78. If a TV is displaying an excessive amount of snow, what section is probably causing the trouble?

    a. R.F. amp.
    b. mixer.
    c. first I.F. amp.
    d. oscillator.

79. If there is weak video and some snow, what stage should the technician troubleshoot?

    a. first I.F. amp.
    b. oscillator.
    c. mixer.
    d. R.F. amp.

80. What channels are in the UHF spectrum?

    a. 2-13.
    b. 14-84.
    c. 2-6.
    d. 7-14.

UNIT POST TEST ANSWER KEY: TELEVISION VIDEO SECTION TROUBLES

LAP .01

1. C
2. A
3. B
4. D
5. A

LAP .02

6. B
7. C
8. D
9. D
10. A

LAP .03

11. A
12. A
13. B
14. C
15. D

LAP .04

16. D
17. C
18. B
19. D
20. B

LAP .05

21. B
22. A
23. D
24. A
25. B

LAP .06

26. B
27. C
28. C
29. A
30. C

LAP .07

31. C
32. B
33. C
34. D
35. A

LAP .08

36. D
37. A
38. D
39. D
40. A

LAP .09

41. A
42. D
43. A
44. A
45. B

LAP .10

46. B
47. A
48. B
49. A
50. B

LAP .11

51. D
52. A
53. A
54. D
55. A

LAP .12

56. A
57. B
58. D
59. B
60. A

LAP .13

61. C
62. C
63. C
64. D
65. D

LAP .14

66. C
67. A
68. C
69. B
70. C

LAP .15

71. D
72. D
73. B
74. A
75. A

LAP .16

76. B
77. D
78. A
79. C
80. B

Student: ____________ File Code: 77.04.03.00.A1-5

Date: ____________ Date Published: 11/25/75

Family Pay Number: ________ Sex: M F (Circle 1)

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UNIT PERFORMANCE TEST: TELEVISION VIDEO SECTION TROUBLES

OBJECTIVE 1:

The student will diagnose malfunctions with regard to video section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunction in the video section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the video section.

The term "video section" refers to the following:

1. tuner section
2. picture tube
3. video detector section
4. video I.F. section
5. video output section

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. no video
2. no audio
3. excessive snow

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron, B & K television analyst, tube checker, oscilloscope, volt-ohmmeter, hand tools, desoldering tools and replacement components.

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Student: ______________________ **File Code:** 77.04.03.00.A1-5

Date: ______________________ **Date Published:** 11-14-74

Family Pay Number: ____________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose video failure.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to video section		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to video		
failure.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to video failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to video failure.		

(Checklist continued)

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

Student must meet criterion on all line items to obtain an overall score of satisfactory.

1

BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

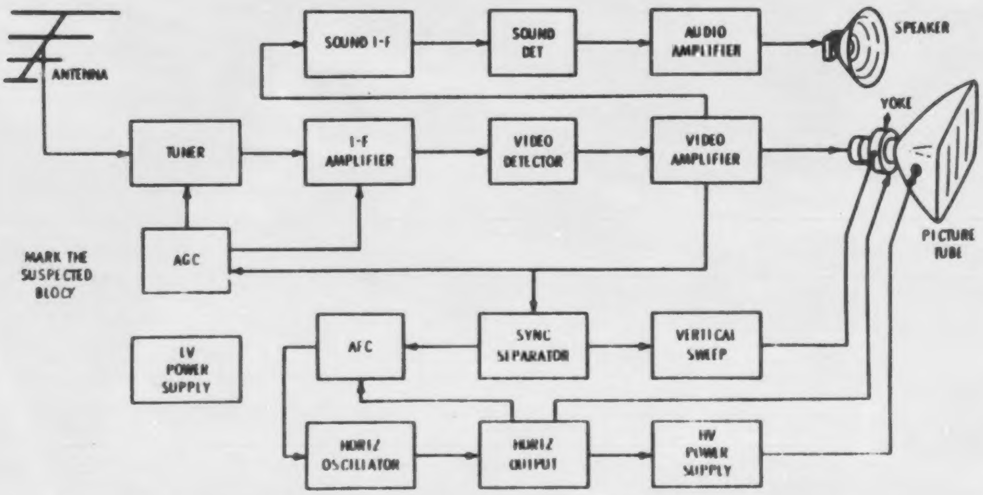
Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**

DIAGNOSIS (suspected block) and comments:

3


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
AGC
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

MARK THE SUSPECTED BLOCK

CORRECTIVE ACTION (suggested or taken):

When your diagnosis is complete, continue with the remainder of the lesson.

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

check for audio
check for video
check for raster
check for snow

OBJECTIVE 2: Troubleshooting

Line item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

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Learning Experience Guide

UNIT: TELEVISION AGC TROUBLES

RATIONALE:

It is important for the person servicing a television receiver to understand the function of the automatic gain control (AGC) circuitry. With this knowledge of normal operation, the symptoms of AGC troubles are more easily identified. The activities in this unit prepares you to isolate troubles in the automatic gain control circuits. Because the oscilloscope is a very practical instrument for troubleshooting, some activities are included in this unit to prepare you to use it.

PREREQUISITES:

Unit .03: Television Video Section Troubles

OBJECTIVES:

Recognize symptoms of trouble; diagnose difficulties; make necessary adjustments; remove, repair and replace components for the automatic gain control (AGC) section of the television receiver using appropriate tools and equipment.

RESOURCES:

Printed Materials

Black & White Television Diagnosis Sheets.
Instruction Manual for 1077 Television Analyst. B & K Division of Dynascan Corporation, 1968.
Motorola Service Manual CTV5L. Motorola Incorporated, Consumer Products Division, Franklin Park, Illinois, 60131, 1973.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Photofact Television Course. Howard W. Sam's Editorial Staff. Howard W. Sam's Co. 1975
Transistor TV Training Course. Robert G. Middleton Howard W. Sam's Co. 1973
Television Symptom Diagnosis Series TSD-133. (Film Loop #08 & 09), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

Principal Author(s): L. Leland & B. Vetter

RESOURCES (Cont.)

Equipment

Color T.V.
Desoldering iron
Desoldering tools
Iron, soldering
Kit, Service Master 99SM or equivalent, Xcelite 99SM Kit, Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Meter, Volt-ohm
Oscilloscope
Projector, Super 8 Sound Film, Model 60, Hickok Teaching Systems, Inc.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 W. Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, KT 185Y, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Tools, Soldering
Transistor F.E.T. checker
Vacuum tube checker.

GENERAL INSTRUCTIONS:

This Unit consists of twelve Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this Unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP)
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the lAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) In this Unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "Evaluation Procedures"
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Automatic Gain Control
.02 AGC Problems
.03 A.G.C. Systems
.04 Symptoms of Automatic Gain Control Problems
.05 Diagnosing AGC Troubles
.06 Audio and Video Stage Problems
.07 Symptoms of Audio and Video Stage Troubles
.08 Diagnosing Audio/Video Section Failures
.09 Diagnosing Audio Section Failures
.10 Diagnosing Video Section Failures
.11 Troubleshooting With an Oscilloscope
.12 Viewing TV Waveforms on an Oscilloscope

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

When you complete reading this unit guide, begin reading the first LAP assigned. You will be expected to use the knowledge and skills acquired in the prerequisites for this unit.

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Date: ____________________ Date Published: 7/29/75

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Glasgow AFB, Montana 59231

UNIT PRETEST: TELEVISION AGC TROUBLES

77.04.04.01

1. When a TV set is not equipped with an A.G.C. amp, where is the A.G.C. voltage applied?

   a. R.F. and I.F. amps.
   b. video amp.
   c. tuner.
   d. horizontal sweep.

2. What type of A.G.C. may be applied to the I.F. amps in a TV set?

   a. forward A.G.C. only.
   b. keyed A.G.C.
   c. reverse A.G.C. only.
   d. both forward and reverse A.G.C.

3. Why does a TV set have an A.G.C. (automatic gain control)?

   a. to have better control over the audio.
   b. to keep the brightness uniform.
   c. to keep the signal strength within the set more uniform.
   d. to keep the contrast at an even rate.

4. What is the type of A.G.C. voltage sent to the A.G.C. amp circuit?

   a. peak-to-peak.
   b. sweep voltage.
   c. average.
   d RMS

5. From what source does the A.G.C. keying circuit obtain its signal sample?

   a. video amp.
   b. horizontal sweep.
   c. A.G.C. amp.
   d. video output.

77.04.04.02

6. What two sections of a TV set have A.G.C. applied to them?

   a. I.F. and R.F. amp.
   b. video amp and sweep circuit.
   c. I.F. amp and video amp.
   d. R.F. amp and mixer.

7. In the R.F. amp of a tuner, the A.G.C. is applied to the:

   a. control grid.
   b. screen grid.
   c. cathode.
   d. plate.

8. What type of A.G.C. is usually incorporated into the tuner?

   a. sweep.
   b. gated.
   c. delayed.
   d. keyed.

9. When a serviceman is testing the A.G.C. voltage with a voltmeter, and the tuner is switched from an unused channel to a strong channel, the voltmeter reading should:

   a. not change.
   b. turn to zero.
   c. swing to B+ voltage.
   d. change by several volts.

10. What type of A.G.C. voltage is most commonly used in solid-state R.F. amps?

   a. keyed.
   b. reverse.
   c. pulsed.
   d. forward.

77.04.04.03

11. The A.G.C. voltage must indicate the strength of the:

   a. sound carrier independent of picture carrier.
   b. blanking pulser.
   c. picture carrier independent of sound carrier.
   d. signal amplitude.

12. What happens to a picture if the I.F. amps are severely over-driven?

   a. bends the raster.
   b. loses contrast.
   c. goes negative.
   d. distorts.

13. What gives a TV set's tuner more control over medium-level signals?

    a. delaying the keying action.
    b. feedback of voltage into the R.F. amplifier's collector circuit.
    c. feedback of voltage into the R.F. amplifier's base circuit.
    d. feedback of A.G.C. voltage back into the emitter circuit.

14. A weak, washed-out picture is caused by a bad A.G.C. or by:

    a. an I.F. amp failure.
    b. a mixer failure.
    c. an R.F. amp failure.
    d. an oscillator failure.

15. With wide variations of signal input to the television receiver, the advantage of the A.G.C. (automatic gain control) is that:

    a. it eliminates horizontal tearing.
    b. it provides a relatively constant output signal.
    c. it minimizes vertical rolling.
    d. it avoids sound variations between stations.

77.04.04.04

16. To which part of a transistor may A.G.C. be applied?

    a. emitter only.
    b. all parts.
    c. collector only.
    d. base only.

17. What happens to a picture if the I.F. amps are severely over-driven?

    a. goes negative.
    b. bends the raster.
    c. distorts.
    d. loses contrast.

18. What type of A.G.C. is usually incorporated into the tuner?

    a. gated.
    b. sweep.
    c. keyed.
    d. delayed.

19. The A.G.C. voltage is applied to which of the following parts of the R.F. amp transistor?

    a. collector.
    b. emitter.
    c. base.
    d. base-emitter junction.

20. What two sections of a TV set have A.G.C. applied to them?

    a. R.F. amp and I.F. amp.
    b. video amp and sweep circuit.
    c. I.F. amp and video amp.
    d. R.F. amp and mixer.

77.04.04.05

21. Does the yoke have any relationship to the video of a TV set?

    a. possibly.
    b. yes.
    c. no.
    d. occasionally.

22. If a TV has a blank raster with no sound and some hum, what section should the serviceman troubleshoot?

    a. A.G.C.
    b. I.F. amp.
    c. tuner.
    d. video amp.

23. If the raster and audio are normal but the video is gone, what section should be suspected as malfunctioning?

    a. tuner.
    b. video amp.
    c I.F. amp.
    d. A.G.C.

24. If the sound and raster are normal but video is displaying severe snow, what might be the trouble?

    a. malfunctioning R.F. amp.
    b. bad mixer.
    c. malfunctioning oscillator.
    d. bad A.G.C.

25. If a TV has normal raster but no audio or video, in which section might the problem exist?

    a. A.G.C.
    b. mixer.
    c. oscillator.
    d. I.F. amp.

77.04.04.06

26. If there is some snow but no audio and no video and a normal raster on a TV set, what section should the repairman troubleshoot?

    a. the first I.F. amp.
    b. the video output.
    c. the oscillator in the tuner.
    d. the video detector.

27. If the raster is normal but a buzz exists in the audio and video is both bent and contrasty, what section might be the source of this problem?

    a. A.G.C.
    b. I.F. amp.
    c. video amp.
    d. tuner.

28. If there is normal sound but no video or raster, what might be the trouble?

    a. bad picture tube.
    b. malfunctioning video amp.
    c. bad video output.
    d. bad A.G.C.

29. If there is normal sound and raster but video is weak, what section should the serviceman troubleshoot?

    a. mixer
    b. R.F. amp.
    c. oscillator.
    d. I.F. amps.

30. If the raster and video are normal but the overall picture is dark, which section should the serviceman troubleshoot?

    a. the picture tube.
    b. the video amp.
    c. A.G.C.
    d. video output.

77.04.04.08

31. If the raster is normal but the sound is weak and the video is displaying a good amount of snow, where should the repairman first look for trouble?

    a. R.F. amp or antenna.
    b. I.F. strip.
    c. A.G.C. and mixer.
    d. mixer and oscillator.

32. What will cause severe snow in the video?

    a. mixer.
    b. oscillator.
    c. R.F. amp.
    d. A.G.C.

77.04.04.09

33. If the audio and raster are normal but the video is weak, what section should the repairman troubleshoot?

    a. I.F. amps.
    b. R.F. amp.
    c. oscillator.
    d. mixer.

34. If there is normal sound but no video or raster, what might be the trouble?

    a. bad video output.
    b. malfunctioning video amp.
    c. bad picture tube.
    d. bad A.G.C.

35. If the raster and video are normal but the overall picture is dark, which section should the repairman troubleshoot?

    a. video amp.
    b. picture tube.
    c. A.G.C.
    d. video output.

77.04.04.10

36. Which of the following scope controls can be compared to a range switch of a voltmeter?

    a. horizontal position control.
    b. vertical-sensitivity control.
    c. horizontal sweep generator.
    d. vertical-position control.

37. Why is it not possible to view the signal in the I.F. section of a TV set?

   a. voltage is too low.
   b. the frequency is too high.
   c. the existence of a pulse voltage.
   d. the signal is unstable.

38. Which control on a scope regulates the horizontal position of the horizontal line?

   a. horizontal rate adjustment.
   b. vertical-position control.
   c. horizontal-position control.
   d. horizontal deflection coil.

39. What is the difference between a scope CRT and a TV's CRT?

   a. cathode.
   b. anode.
   c. phosphor.
   d. the method of deflection.

40. What gives a scope its operating voltage?

   a. power supply.
   b. battery.
   c. 110 AC outlet.
   d. a variable capacitor.

77.04.04.11

41. A scope can measure both waveform and:

   a. voltage.
   b. current.
   c. RMS voltage.
   d. resistance.

42. A signal circuit can be evaluated by using a scope:

   a. to take voltage readings.
   b. to see if it is operating correctly.
   c. to take resistance measurements.
   d. for component changes.

43. What is connected to the horizontal deflection plates of a scope?

   a. a high voltage.
   b. the horizontal signal.
   c. the signal from the input.
   d. a sweep generator.

44. The vertical-deflection amplifier applies its signal to the:

   a. scope's vertical-sensitivity control.
   b. the horizontal deflection plates of the scope.
   c. vertical deflection plates of the scope.
   d. scope's focus circuit.

45. The speed at which the beam scans horizontally across the scope can be varied with the:

   a. sweep-rate adjustment.
   b. vertical input knob.
   c. focus.
   d. vertical speed control.

UNIT PRETEST ANSWER KEY: TELEVISION AGC TROUBLES

LAP .01

1. A
2. D
3. C
4. C
5. A

LAP .02

6. A
7. A
8. C
9. D
10. D

LAP .03

11. D
12. C
13. B
14. A
15. B

LAP .04

16. B
17. A
18. D
19. C
20. A

LAP .05

21. C
22. D
23. B
24. A
25. A

LAP .06

26. C
27. C
28. A
29. D
30. A

LAP .08

31. A
32. C

LAP .09

33. A
34. C
35. B

LAP .10

36. B
37. B
38. C
39. D
40. A

LAP .11

41. A
42. B
43. D
44. C
45. A

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Automatic Gain Control

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the automatic gain control stages of a television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 8 in the above resource.
2. Answer the review questions for Chapter 8.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): P. Schuster & R. Arneson

Student: ____________________ File Code: 77.04.04.01.A2-2

Date: ____________________ Date Published: 11/29/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: AUTOMATIC GAIN CONTROL

1. What type of A.G.C. may be applied to the I.F. amps in a TV set?

    a. forward A.G.C. only.
    b. keyed A.G.C.
    c. both forward and reverse A.G.C.
    d. reverse A.G.C. only.

2. To which parts of a transistor may A.G.C. be applied?

    a. the emitter only.
    b. the base only.
    c. the collector only.
    d. all parts.

3. What switches the keying transistor in the A.G.C. circuit on and off?

    a. A.G.C. amp.
    b. the horizontal sweep pulse.
    c. video signal.
    d. diode.

4. In a TV set, the A.G.C. amp gets its incoming signal from:

    a. the horizontal sweep.
    b. R.F. amp.
    c. the A.G.C. keying circuit.
    d. I.F. amp.

5. When a TV signal increases at the antenna:

    a. the audio level decreases.
    b. the keying pulse diminishes.
    c. the R.F. amp level also increases.
    d. the video level also increases.

6. Which type of A.G.C. is most common in TV sets?

    a. both forward and reverse.
    b. keyed.
    c. reverse.
    d. forward.

7. The type of A.G.C. control which is preferred due to its ability to require very little power from the A.G.C. circuit is:

   a. base control.
   b. emitter control.
   c. collector control.
   d. type available.

8. From what source does the A.G.C. keying circuit obtain its signal sample?

   a. horizontal sweep.
   b. video amp.
   c. A.G.C. amp.
   d. video output.

9. Why does a TV set have an A.G.C. (automatic gain control)?

   a. to keep the brightness uniform.
   b. to keep the signal strength within the set more uniform.
   c. to have better control.
   d. to keep the contrast at an even rate.

10. An A.G.C. keying circuit is sometimes referred to as a:

   a. pulse.
   b. gate.
   c. delay.
   d. relay.

LAP TEST ANSWER KEY: AUTOMATIC GAIN CONTROL

1. C
2. D
3. B
4. C
5. D
6. D
7. A
8. B
9. B
10. B

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Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: AGC Problems

OBJECTIVE:

Given typical symtoms commonly related to malfunctions in a TV set, identify the AGC stage in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.
Photofact Television Course by Sam's Ed. Staff

PROCEDURE:

1. Read Lesson 8 in the response manual.
2. Complete the Practice Exercises for Lesson #8.
3. Check your answers with the answer key.
4. Read Chapter 16, "Automatic Gain Control", in the Photofact Television Course.
5. Answer the questions at the end of Chapter 16.
6. Check your answer with the answer key.
7. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson & B. Vetter

Student: ______________________ File Code: 77.04.04.02.A2-2

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LAP TEST: AGC PROBLEMS

1. In the R.F. amp of a tuner, the A.G.C. is applied to the:

   a. cathode.
   b. control grid.
   c. plate.
   d. screen grid.

2. What type of A.G.C. voltage can be used in solid state tuners?

   a. forward only.
   b. reverse only.
   c. keyed.
   d. forward or reverse.

3. What type of A.G.C. is usually incorporated into the tuner?

   a. gated.
   b. sweep.
   c. delayed.
   d. keyed.

4. What type of A.G.C. is involved in reducing the RF gain after the signal reaches a certain level?

   a. delayed.
   b. keyed.
   c. pulse.
   d. sweep.

5. The A.G.C. voltage is applied to which of the following parts of the R.F. amp transistor:

   a. base emitter junction.
   b. base.
   c. collector.
   d. emitter.

6. If the TV set has too much gain, the raster will be:

   a. bent.
   b. snowy.
   c. washed out.
   d. normal.

7. What type of A.G.C. is most commonly used in tube type tuners?

   a. sweep
   b. forward voltage.
   c. reverse voltage.
   d. keyed.

8. What two sections of a TV set have A.G.C. applied to them?

   a. I.F. amp and video amp.
   b. video amp and sweep circuit.
   c. I.F. and R.F. amp.
   d. R.F. amp and mixer.

9. What piece of test equipment is most often used to check the A.G.C. action?

   a. a signal generator.
   b. an ohmmeter.
   c. a voltmeter.
   d. an oscilloscope.

10. To obtain a good signal-to-noise ratio, the R.F. amp is operated at:

    a. a low gain level.
    b. a low noise level.
    c. full gain.
    d. a high A.G.C. level.

LAP TEST ANSWER KEY: AGC PROBLEMS

1. B
2. D
3. C
4. A
5. B
6. A
7. C
8. C
9. C
10. C

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Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: AGC Systems

OBJECTIVE:

Identify characteristics of AGC systems used in solid state television receivers.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television TV Training Course by Middleton

PROCEDURE:

STEPS

1. Read Chapter 5 "AGC Systems" in the above resource.
2. Answer the review questions at the end of the chapter.
3. Check your answers with the answer key.
4. Take the LAP test.

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Student: ____________________ **File Code:** 77.04.04.03.A2-2

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Glasgow AFB, Montana 59231

LAP TEST: AGC SYSTEMS

1. How many different types of A.G.C. systems are found in transistor televisions?

   a. 4
   b. 5
   c. 3
   d. 6

2. One advantage of reverse A.G.C. is that the input and output __________ of controlled transistors vary less than when forward A.G.C. is used.

   a. voltages.
   b. resistance.
   c. impedance.
   d. phase shifting.

3. Why is keyed A.G.C. preferred over unkeyed A.G.C.?

   a. more stability on weaker signals.
   b. less effect of noise pulses.
   c. conduction during vertical retrace only.
   d. better range over a variety of signals.

4. Where may the A.G.C. voltage be applied on transistors for correct action?

   a. emitter or base.
   b. base and collector.
   c. emitter and collector.
   d. emitter, base or collector.

5. Instead of a transistor, a ________ may be used in the gate section of a keyed A.G.C. system.

   a. compactron tube.
   b. triac.
   c. bridge.
   d. tube.

6. In a hybrid receiver, if the controlled devices are tubes, the A.G.C. circuit is designed to provide a ________ voltage output.

   a. positive.
   b. negative.
   c. forward.
   d. reverse.

7. Why is it necessary for a horizontal pulse to be used in the A.G.C. section?

   a. outside voltage source.
   b. gating of the A.G.C. transistor.
   c. to provide for forward bias.
   d. for blanking during horizontal retrace.

8. Is a transistor capable of double duty as a signal amplifier and as a D-C amplifier for the A.G.C. filtering?

   a. yes.
   b. no.
   c. only in hybrid sets.
   d. only in color sets.

9. The gain of a transistor ________ as the collector voltage is reduced.

   a. increases.
   b. saturates.
   c. decreases.
   d. stops.

10. Instead of a transistor, a ________ may be used in the gate section of a keyed A.G.C. system.

   a. R-C network.
   b. integrated circuit.
   c. thermistor.
   d. semi-conductor bridge.

LAP TEST ANSWER KEY: AGC SYSTEMS

1. B
2. C
3. B
4. A
5. C
6. B
7. B
8. A
9. C
10. D

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Symptoms of Automatic Gain Control Problems

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the AGC circuits of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Film Loop #08, Automatic Gain Control Problems.
Projector.

PROCEDURE:

1. View Film Loop #08 as indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson & B. Vetter

Student: ____________________ File Code: 77.04.04.04.A2-2

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LAP TEST: SYMPTOMS OF AUTOMATIC GAIN CONTROL PROBLEMS

1. A weak, washed out picture is caused by a bad A.G.C. or by:

    a. a mixer failure.
    b. an oscillator failure.
    c. an R.F. amp failure.
    d. an I.F. amp failure.

2. What happens to a picture if the I.F. amps are severely over driven?

    a. bends the raster.
    b. distorts.
    c. loses contrast.
    d. goes negative.

3. A.G.C. is advantageous for TV receivers because it:

    a. keeps the picture intensity fixed at one level.
    b. keeps the picture intensity constantly roaming.
    c. develops the necessary audio signal across the resistor.
    d. keeps the price of manufacturing down to a minimum.

4. What gives a TV set's tuner more control over medium level signals?

    a. delaying the keying action.
    b. feedback of A.G.C. voltage back into the emitter circuit.
    c. feedback of voltage into the R.F. amplifier's collector circuit.
    d. feedback of voltage into the R.F. amplifier's base circuit.

5. If the incoming signal gets stronger, then the A.G.C. will:

    a. remain the same.
    b. become weaker.
    c. turn positive.
    d. get stronger.

6. What is the frequency of A.G.C. line in a TV set?

    a. 60 cycles.
    b. 15,750 cycles.
    c. 42.55 cycles.
    d. 41.25 MHZ.

7. With the manual control set at the desired contrast, the TV's A.G.C. circuit can automatically keep the video signal at:

   a. a lower range.
   b. a wider range of levels.
   c. a higher level.
   d. the same level.

8. The A.G.C. voltage must indicate the strength of the:

   a. sound carrier independent of picture carrier.
   b. picture carrier independent of sound carrier.
   c. signal amplitude.
   d. blanking pulser.

9. What is the best way to check an A.G.C. circuitry?

   a. an oscilloscope.
   b. a voltmeter.
   c. a R.F. generator.
   d. an ohmmeter.

10. When the A.G.C. completely cuts off the I.F. amps, this results in:

    a. weak sound.
    b. weak video.
    c. a flat white raster.
    d. snow.

LAP TEST ANSWER KEY: SYMPTOMS OF AUTOMATIC GAIN CONTROL PROBLEMS

1. D
2. D
3. A
4. C
5. D
6. B
7. D
8. C
9. B
10. C

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing AGC Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the AGC circuits of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on the unit performance test.

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams
Instruction Manual For 1077 Television Analyst, B & K Division of Dynascan Corp.

Hand tools
Oscilloscope
Soldering & desoldering irons and tools
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Transistor Checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Read "Key Pulse", page 42 in Instruction Manual for Model 1077 Television Analyst.
3. Diagnose the receiver using the television analyst.
4. After diagnosis is completed, fill in all requested data on a diagnosis Sheet.
5. Locate the malfunction(s) and verify it with the instructor.
6. After instructor's verification, correct the malfunction(s).
7. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.04.04.05.A2-2

Date: ______________________ Date Published: 11/29/77

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LAP TEST: DIAGNOSING AGC TROUBLES

1. What piece of test equipment is most often used to check the A.G.C. action?

   a. signal generator.
   b. voltmeter.
   c. ohmmeter.
   d. scope.

2. What switches the keying transistor in the A.G.C. circuit on and off?

   a. a diode.
   b. the A.G.C. amp.
   c. the video signal.
   d. the horizontal sweep pulse.

3. What type of A.G.C. voltage is sent to the A.G.C. amp circuit?

   a. sweep.
   b. average.
   c. peak to peak.
   d. RMS.

4. An A.G.C. keying circuit is sometimes referred to as a:

   a. gate.
   b. delay.
   c. pulse.
   d. relay.

5. What two sections of a TV set have A.G.C. applied to them?

   a. R.F. amp and mixer.
   b. I.F. amp and video amp.
   c. R.F. amp and I.F. amp.
   d. video amp and sweep circuit.

6. What type of A.G.C. is usually incorporated into the tuner?

   a. gated.
   b. delayed.
   c. keyed.
   d. sweep.

7. What is the frequency of the A.G.C. line in a TV set?

   a. 60 cycles.
   b. 42.55 cycles.
   c. 15,750 cycles.
   d. 41.25 MHZ

8. What type of A.G.C. voltage can be used in solid-state tuners?

   a. reverse only.
   b. keyed.
   c. forward only.
   d. forward or reverse.

9. The A.G.C. voltage must indicate the strength of the:

   a. signal amplitude.
   b. picture carrier independent of sound carrier.
   c. blanking pulses.
   d. sound carrier independent of picture carrier.

10. What happens to a picture if the I.F. amps are severely over-driven?

   a. loses contrast.
   b. bends the raster.
   c. distorts.
   d. goes negative.

LAP TEST ANSWER KEY: DIAGNOSING AGC TROUBLES

1. B
2. D
3. B
4. A
5. C
6. B
7. C
8. D
9. A
10. D

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Audio and Video Stage Problems

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a television set, identify the audio or video stage(s) in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Systems of Audio and Video Stage Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 9 in the response manual.
2. Complete the Practice Exercises for Lesson 9.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of Audio and Video Stage Troubles

OBJECTIVE:

Observe typical symptoms related to malfunctions in the audio/video sections of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Film Loop No. 09, Symptom Set I.

Projector.

PROCEDURE:

1. View Film Loop No. 09 as indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.04.06.A2-2
77.04.04.07.A2-2

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LAP TEST: AUDIO AND VIDEO STAGE PROBLEMS

1. The raster and video are normal, but the overall picture is dark. Which section should the serviceman troubleshoot?

   a. the picture tube.
   b. the video amp.
   c. the A.G.C.
   d. video output.

2. If a TV has a blank raster with no sound and some hum, what section should the serviceman troubleshoot?

   a. I.F. amp.
   b. video amp.
   c. A.G.C.
   d. tuner.

3. The raster and audio are normal, but the video is gone. What section should be suspected as malfunctioning?

   a. I.F. amp.
   b. A.G.C.
   c. tuner.
   d. video amp.

4. The audio is weak and video is weak with some snow present. The raster is normal. What section should the repairman troubleshoot?

   a. mixer.
   b. oscillator in the tuner.
   c. video output.
   d. I.F. amp.

5. A TV has normal raster, but no audio or video. In which section might the problem exist?

   a. mixer.
   b. R.F. amp.
   c. video output.
   d. A.G.C.

6. There is some snow, no audio and no video with a normal raster on a TV set. What section should the repairman troubleshoot?

   a. the video detector.
   b. the oscillator in the tuner.
   c. the first I.F. amp.
   d. the video output.

7. The audio is noisy. The raster is not distorted, but video is displaying a contrasty picture. What section might cause this problem?

   a. video amp.
   b. A.G.C.
   c. first I.F. amp.
   d. contrast control open.

8. The audio is very weak, but the volume control has some effect. Both the video and raster are normal. What is the suspected trouble?

   a. bad audio output.
   b. bad video output.
   c. bad sound I.F.
   d. bad third I.F. amp.

9. The raster is normal, but both the sound and video are dead. The video section was checked and found to be ok. What other section might cause this problem?

   a. first I.F. amp.
   b. third I.F. amp.
   c. R.F. amp.
   d. local oscillator.

10. The raster is normal, but a buzz exists in the audio and video is both bent and contrasty. What section might be the source of this problem?

    a. A.G.C.
    b. video amp.
    c. I.F. amp.
    d. tuner.

LAP TEST ANSWER KEY: AUDIO AND VIDEO STAGE PROBLEMS

LAP .06

1. A
2. B
3. D
4. D
5. D

LAP .07

6. B
7. B
8. C
9. B
10. A

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Audio/Video Section Failures

OBJECTIVE:

Diagnose and repair AGC malfunctions commonly found in the audio/video sections of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Video Section Failures" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
Oscilloscope
Soldering & desoldering irons and tools
Volt-ohmmeter
TSD Trainer or television set

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.

2. Diagnose the television receiver for possible malfunction(s).

3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.

4. Locate the malfunction(s) and verify it with the instructor.

5. After instructor verification, correct the malfunction(s).

6. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Audio Section Failures

OBJECTIVE:

Diagnose and repair AGC malfunctions commonly found in the audio section of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Video Section Failures" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
Oscilloscope
Soldering & desoldering irons and tools
TSD Trainer or television set
Volt-ohmmeter

PROCEDURE.

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.04.08.A2-2
77.04.04.09.A2-2
77.04.04.10.A2-2

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LAP TEST: DIAGNOSING AUDIO/VIDEO SECTION FAILURES, AUDIO SECTION FAILURES, AND VIDEO SECTION FAILURES

77.04.04.08

1. Does the yoke have any relationship to the video of a TV set?

   a. possibly..
   b. occasionally.
   c. yes.
   d. no.

2. If a TV has a normal raster but no audio or video, in what section might the problem exist?

   a. I.F. amp.
   b. A.G.C.
   c. mixer.
   d. oscillator.

77.04.04.09

3. If the raster is normal but the sound is weak and the video is displaying a good amount of snow, where should the repairman first look for trouble?

   a. I.F. strip.
   b. mixer and oscillator.
   c. R.F. amp or antenna.
   d. A.G.C. and mixer.

4. If the audio is very weak but the volume control has some effect and both the video and raster are normal, what is the problem?

   a. bad sound I.F.
   b. bad video output.
   c. bad third I.F. amp.
   d. bad audio output.

5. What will cause severe snow in the video?

   a. A.G.C.
   b. R.F. amp.
   c. oscillator.
   d. mixer.

77.04.04.10

6. If there is normal sound but no video or raster, what might be the trouble?

    a. bad picture tube.
    b. bad A.G.C.
    c. bad video output.
    d. malfunctioning video amp.

7. The raster and audio are normal but there is no video. What section should be checked?

    a. tuner.
    b. video amp.
    c. I.F. amp.
    d. A.G.C.

8. The audio and raster are normal but the video is weak. What section should the repairman troubleshoot?

    a. oscillator.
    b. mixer.
    c. I.F. amps.
    d. R.F. amp.

9. The raster is normal but both the audio and video are dead and the video section has been checked and found to be okay. What other section might cause this problem?

    a. first I.F. amp.
    b. local oscillator.
    c. R.F. amp.
    d. third I.F. amp.

10. The raster and video are normal but the overall picture is dark. Which section should the repairman troubleshoot?

    a. video output.
    b. video amp.
    c. A.G.C.
    d. picture tube.

LAP TEST ANSWER KEY: DIAGNOSING AUDIO/VIDEO SECTION FAILURES, AUDIO SECTION FAILURES, AND VIDEO SECTION FAILURES

LAP .08

1. D
2. B

LAP .09

3. C
4. A
5. B

LAP 10

6. A
7. B
8. C
9. D
10. D

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Diagnosing Video Section Failures

OBJECTIVE:

Diagnose and repair AGC malfunctions commonly found in the video sections of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on the unit performance test.

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
Oscilloscope
Soldering & desoldering irons and tools
TSD Trainer or television set
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s)
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and verify it with the instructor.
5. After instructor verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Troubleshooting With an Oscilloscope

OBJECTIVE:

Describe typical television troubleshooting procedures when using an oscilloscope.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Viewing TV Waveforms on an Oscilloscope" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 9, Pages 69-73 in the above resource.
2. Answer the review questions for Chapter 9.
3. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Viewing TV Waveforms on an Oscilloscope

OBJECTIVE:

Given a television set, its schematic and an oscilloscope; view waveforms of the television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Motorola Service Manual CTV5L, Motorola Inc.

Oscilloscope
TSD Trainer

PROCEDURE:

1. Obtain an oscilloscope and go to the TSD Trainer station.
2. Set up equipment.
3. Do the following assignments using Motorola Service Manual CTV5L:
   a. View waveform at test-point W20 (given on schematic).
   b. View waveform at test-point W21 (given on schematic).
   c. View waveform at test-point W24 (given on schematic).
4. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.04.11.A2-2
77.04.04.12.A2-2

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LAP TEST: TROUBLESHOOTING WITH AN OSCILLOSCOPE/ VIEWING TV WAVEFORMS ON AN OSCILLOSCOPE

77.04.04.11

1. Why is it not possible to view the signal in the I.F. section of a TV set?

   a. the frequency is too high.
   b. the existence of a pulse voltage.
   c. voltage is too low.
   d. the signal is unstable.

2. The intensity and focus are connected to:

   a. the scope's deflection plates.
   b. the scope's second anode.
   c. the cathode of the scope.
   d. the scope's power supply.

3. What is the best piece of test equipment to use when checking the A.G.C.?

   a. voltmeter.
   b. scope.
   c. ohmmeter.
   d. ammeter.

4. What is the difference between a scope CRT and a TV's CRT?

   a. anode.
   b. color.
   c. cathode.
   d. the method of deflection.

5. What gives a scope its operating voltage?

   a. 110 AC outlet.
   b. battery.
   c. a variable capacitor.
   d. power supply.

77.04.04.12

6. The method used to discover how many volts it takes to move the scope spot one inch is called:

   a. peak to peak voltage.
   b. calibration.
   c. effective voltage.
   d. deflection.

7. What is the first step in using a scope for viewing waveforms?

   a. set the range switch.
   b. turn the intensity control to mid-range.
   c. allow the scope to warm up properly.
   d. adjust controls for horizontal line.

8. What type of sync is selected on a scope?

   a. external and horizontal.
   b. internal and external.
   c. horizontal and vertical.
   d. internal and vertical.

9. A signal circuit can be evaluated by using a scope:

   a. for component changes.
   b. to see if it is operating correctly.
   c. to take voltage readings.
   d. to take resistance measurements.

10. The speed at which the beam scans horizontally across the scope can be varied with the:

    a. sweep rate adjustment.
    b. vertical speed control.
    c. focus.
    d. vertical input knob.

LAP TEST ANSWER KEY: TROUBLESHOOTING WITH AN OSCILLOSCOPE/ VIEWING TV WAVEFORMS ON AN OSCILLOSCOPE

LAP .11

1. A
2. D
3. A
4. D
5. D

LAP .12

6. B
7. C
8. B
9. B
10. A

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UNIT POST TEST: TELEVISION AGC TROUBLES

77.04.04.01

1. Which stages of the I.F. strip are equipped with A.G.C.?

   a. the first and second.
   b. the second and third.
   c. all stages.
   d. the first and third.

2. When a TV signal increases at the antenna:

   a. the video level also increases.
   b. the keying pulse diminishes.
   c. the audio level decreases.
   d. the R.F. amp level also increases.

3. The type of A.G.C. control which is preferred due to its ability to require very little power from the A.G.C. circuit is:

   a. type available.
   b. emitter control.
   c. base control.
   d. collector control.

4. In a TV set, the A.G.C. amp gets its incoming signal from:

   a. I.F. amp.
   b. R.F. amp.
   c. the A.G.C. keying circuit.
   d. the horizontal sweep.

5. What switches the keying transistor in the A.G.C. circuit on and off?

   a. diode.
   b. the horizontal sweep pulse.
   c. ideo signal.
   d. A.G.C. amp.

77.04.04.02

6. The A.G.C. voltage is applied to which of the following parts of the R.F. amp transistor?

   a. base-emitter junction.
   b. base.
   c. emitter.
   d. collector.

7. What type of A.G.C. voltage can be used in solid-state tuners?

   a. reverse only.
   b. keyed.
   c. forward only.
   d. forward or reverse.

8. If the A.G.C. has failed, and the gain is low, the TV will appear to have a bad:

   a. mixer.
   b. oscillator.
   c. R.F. amp.
   d. I.F. amp.

9. If the TV set has too much gain, the raster will be:

   a. snowy.
   b. bent.
   c. washed out.
   d. normal.

10. To obtain a good signal-to-noise ratio, the R.F. amp is operated at:

    a. a low gain level.
    b. a high A.G.C. level.
    c. a low noise level.
    d. full gain.

77.04.04.03

11. When the A.G.C. completely cuts off the I.F. amps, this results in:

    a. a flat white raster.
    b. weak sound.
    c. snow.
    d. weak video.

12. The A.G.C. voltage must indicate the strength of the:

    a. sound carrier independent of the picture carrier.
    b. signal amplitude.
    c. blanking pulser.
    d. picture carrier independent of the sound carrier.

13. What is the best way to check an A.G.C. circuitry?

    a. a R.F. generator.
    b. an ohmmeter.
    c. a voltmeter.
    d. an oscilloscope.

14. If the incoming signal gets stronger, then the A.G.C. will:

    a. become weaker.
    b. get stronger.
    c. remain the same.
    d. turn positive.

15. With the manual control set at the desired contrast, the TV's A.G.C. circuit can automatically keep the video signal at:

    a. a higher level.
    b. a wider range of levels.
    c. a lower range.
    d. the same level.

77.04.04.04

16. What switches the keying transistor in the A.G.C. circuit on and off?

    a. the horizontal sweep pulse.
    b. a diode.
    c. the video signal.
    d. the A.G.C. amp.

17. What type of A.G.C. voltage can be used in solid-state tuners?

    a. reverse only.
    b. forward only.
    c. forward or reverse.
    d. keyed.

18. An A.G.C. keying circuit is sometimes referred to as a:

    a. pulse.
    b. delay.
    c. gate.
    d. relay.

19. What type of A.G.C. voltage is sent to the A.G.C. amp circuit?

    a. RMS
    b. peak-to-peak.
    c. average.
    d. sweep.

20. When a TV signal increases at the antenna:

    a. the R.F. amp level increases.
    b. the keying pulse diminishes.
    c. the audio level decreases.
    d. the video level increases.

77.04.04.05

21. If the audio is weak and video is weak with some snow present but the raster is normal, what section should the repairman troubleshoot?

    a. mixer.
    b. I.F. amp.
    c. oscillator in the tuner.
    d. video output.

22. If the sound and raster are normal but video is displaying severe snow, what might be the trouble?

    a. bad A.G.C.
    b. malfunctioning R.F. amp.
    c. bad mixer.
    d. malfunctioning oscillator.

23. Does the yoke have any relationship to the video of a TV set?

    a. no.
    b. yes.
    c. occasionally.
    d. possibly.

24. If the raster and audio are normal but the video is gone, what section should be suspected as malfunctioning?

    a. tuner.
    b. video amp.
    c. A.G.C.
    d. I.F. amp.

25. If a TV has a blank raster with no sound, what section should the serviceman toubleshoot?

    a. tuner.
    b. 1st I.F. amp.
    c. video amp.
    d. A.G.C.

77.04.04.06

26. If there is normal sound and raster but video is weak, what section should the serviceman troubleshoot?

    a. I.F. amps.
    b. mixer.
    c. R.F. amp.
    d. oscillator.

27. If the raster is normal but the sound is weak and video is displaying a good deal of snow, where should the repairman first look for the malfunctioning section?

    a. I.F. strip.
    b. A.G.C. and mixer.
    c. mixer and oscillator.
    d. R.F. amp or antenna.

28. If there is normal sound but no video or raster, what might be the trouble?

    a. malfunctioning video amp.
    b. bad video output.
    c. bad A.G.C.
    d. bad picture tube.

29. If the audio is noisy and the raster is not distorted, but video is displaying a contrasty picture, what section might cause this problem?

    a. first I.F. amp.
    b. A.G.C.
    c. video amp.
    d. contrast control open.

30. If the raster is normal but a buzz exists in the audio and the video is both bent and contrasty, what section might be the source of this problem?

    a. tuner.
    b. video amp.
    c. A.G.C.
    d. I.F. amp.

77.04.04.07

31. Does the yoke have any relationship to the video of a TV set?

    a. yes.
    b. occasionally.
    c. no.
    d. possibly.

32. If a TV has a normal raster but no audio or video, in what section might the problem exist?

a. mixer.
b. oscillator.
c. I.F. amp.
d. A.G.C.

77.04.04.08

33. If the audio is very weak but the volume control has some effect and both the video and raster are normal, what is the problem?

a. bad video output.
b. bad audio output.
c. bad third I.F. amp.
d. bad sound I.F.

77.04.04.09

34. If the raster and audio are normal but there is no video, what section should be checked?

a. video amp.
b. I.F. amp.
c. tuner.
d. A.G.C.

35. If the raster is normal but both the audio and video are dead and the video section has been checked and found to be okay, what other section might cause this problem?

a. third I.F. amp.
b. R.F. amp.
c. first I.F. amp.
d. local oscillator.

77.04.04.10

36. What type of voltage is measured with a scope?

a. effective.
b. average.
c. peak-to-peak.
d. RMS

37. Which control on a scope regulates the horizontal position of the horizontal line?

    a. horizontal rate adjustment.
    b. horizontal-position control.
    c. horizontal deflection coil.
    d. vertical-position control.

38. What is the best piece of test equipment to use when checking the A.G.C.?

    a. ohmmeter.
    b. voltmeter.
    c. ammeter.
    d. scope.

39. What is the difference between a scope CRT and a TV's CRT?

    a. the method of deflection.
    b. anode.
    c. color.
    d. cathode.

40. What gives a scope its operating voltage?

    a. power supply.
    b. battery.
    c. 110 AC outlet.
    d. a variable capacitor.

77.04.04.11

41. The method used to discover how many volts it takes to move the scope spot one inch is called:

    a. calibration.
    b. effective voltage.
    c. deflection.
    d. peak-to-peak voltage.

42. Can you check the second anode voltage with a scope?

    a. no.
    b. possibly.
    c. yes.
    d. occasionally.

43. A scope can measure both waveform and:

    a. resistance.
    b. voltage.
    c. RMS voltage.
    d. current.

44. What is connected to the horizontal deflection plates of a scope?

    a. the horizontal signal.
    b. the signal from the input.
    c. a high voltage.
    d. a sweep generator.

45. The speed at which the beam scans horizontally across the scope can be varied with the:

    a. sweep-rate adjustment.
    b. vertical input knob.
    c. focus.
    d. vertical speed control.

UNIT POST TEST ANSWER KEY: TELEVISION AGC TROUBLES

LAP .01

1. A
2. A
3. C
4. C
5. B

LAP .02

6. B
7. D
8. D
9. B
10. D

LAP .03

11. A
12. B
13. C
14. B
15. D

LAP .04

16. A
17. C
18. C
19. C
20. D

LAP .05

21. B
22. B
23. A
24. B
25. C

LAP .06

26. A
27. D
28. D
29. B
30. C

LAP .07

31. C
32. D

LAP .08

33. D

LAP .09

34. A
35. A

LAP .10

36. C
37. B
38. B
39. A
40. A

LAP .11

41. A
42. A
43. B
44. D
45. A

Student: ____________________ **File Code:** 77.04.04.00.A1-5

Date: ____________________ **Date Published:** 11/25/75

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Family Pay Number: __________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: TELEVISION AGC TROUBLES

OBJECTIVE 1:

The student will diagnose malfunctions with regard to A.G.C. section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunction in the A.G.C. section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the A.G.C. section.

The term "A.G.C. section" refers to the following:

1. A.G.C. section
2. Audio section
3. I.F. section
4. Video section

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. no video
2. no audio
3. excessive snow
4. improper A.G.C.

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron, B & K television analyst, oscilloscope, tube checker, volt-ohmmeter, transistor checker, hand tools, desoldering tools, and replacement components.

Student: ____________________ **File Code:** 77.04.04.00.A1-5

Date: ____________________ **Date Published:** 11-14-74

Family Pay Number: ____________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory _____ Unsatisfactory _____

	CRITERION Met	 Not Met
Objective 1:		
1. Student will correctly diagnose A.G.C. failures.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to A.G.C. section		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to A.G.C. sections.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to A.G.C. failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to A.G.C. failure.		

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

Student must meet criterion on all line items to obtain an overall score of satisfactory.

1

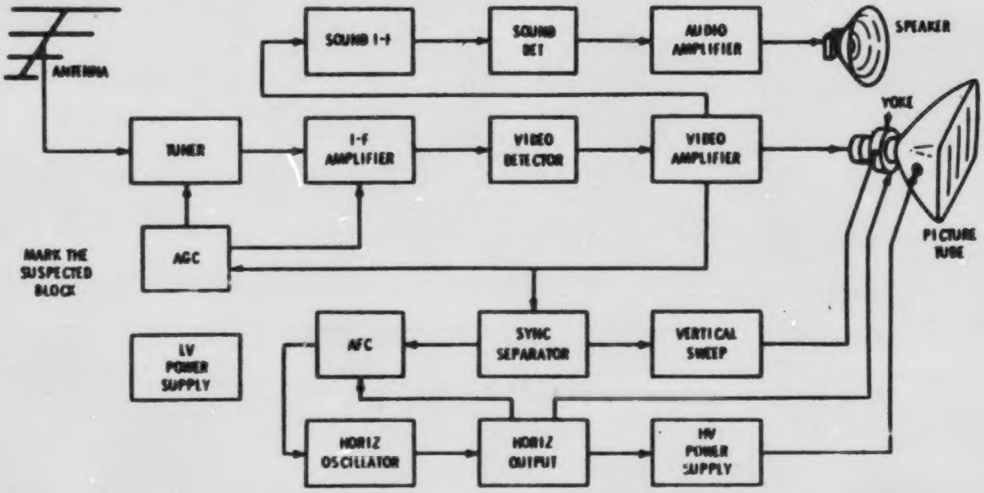
BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**
DIAGNOSIS (suspected block) and comments:		

3


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
AGC
SYNC SEPARATOR
AFC
VERTICAL SWEEP
LV POWER SUPPLY
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

MARK THE SUSPECTED BLOCK

CORRECTIVE ACTION (suggested or taken):

When your diagnosis is complete, continue with the remainder of the lesson.

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

- check for audio
- check for video
- check for raster
- check for snow
- checks for A.G.C.

OBJECTIVE 2: Troubleshooting

Line item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.

Uses VOM according to manufacturer's directions.

Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

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Learning Experience Guide

UNIT: TELEVISION SWEEP SECTION TROUBLES

RATIONALE:

The diagnosis of sweep and synchronization trouble is part of a serviceman's duties. The service person needs to know about the sweep and synchronization sections function to effectively diagnose and repair television receivers. Practice in diagnosis and repair of sweep and synchronization sections improves troubleshooting techniques.

PREREQUISITES:

Unit 77.04.04. Television AGC Troubles.

OBJECTIVE:

Diagnose difficulties; make adjustments; and remove, repair and replace components for the synchronization and sweep sections of the television receiver.

RESOURCES:

Printed Materials

Black & White Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst. B & K Division of Dynascan Corporation, 1968.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Photofact Television Course. Howard W. Sams Editorial Staff, Howard W. Sams and Company, Inc. 1975.
Transistor TV Training Course. Robert G. Middleton, Howard W. Sams and Company, Inc., 1973.

Audio/Visuals

Super 8 Sound Film:

Television Symptom Diagnosis Series TSD-133. (Film Loop Nos. 10, 11, 12, 13 & 14), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

Principal Author(s): L. Leland & B. Vetter

RESOURCES: (continued)

Equipment

Cathode ray tube checker .
Projector, Super 8 Sound Film, Model 60, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 W. Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, KT-185Y, Hickok Teaching Systems, Inc.
Color T.V.
Transistor F.E.T. checker
Vacuum tube checker
Desoldering iron
Oscilloscope
Desoldering tools
Iron, soldering
Kit, Service Master 99SM or equivalent - Xcelite 99SM Kit, Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Meter, vacuum tube volt
Meter, volt-ohm
Tools, soldering

GENERAL INSTRUCTIONS:

This unit consists of 20 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) In this unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "Evaluation Procedures."
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 The Sync Section
.02 Horizontal & Vertical Sync Sections
.03 Sync Separator Failure
.04 Symptoms of Sync Separator Troubles
.05 Diagnosing Sync Separator Troubles
.06 Television Sync Problems
.07 Loss of Vertical Sync
.08 Symptoms of Vertical Sync Troubles

PERFORMANCE ACTIVITIES: (continued)

.09 Diagnosing Vertical Sync Troubles
.10 The Horizontal Sync
.11 Loss of Horizontal Sync
.12 Symptoms of Horizontal Sync Troubles
.13 Diagnosing Horizontal Sync Troubles
.14 Picture Sweep Failure
.15 Loss of Vertical Sweep
.16 Symptoms of Vertical Sweep Troubles
.17 Diagnosing Vertical Sweep Trouble
.18 Audio/Video/Sweep Section Troubles
.19 Symptoms of Audio/Video/Sweep Section Troubles
.20 Diagnosing Sweep Section Troubles
.21 Diagnosing Audio/Video/Sweep Section Troubles

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After you read this unit guide, go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

In this unit, you are expected to use the knowledge and skill acquired in the prerequisites for this unit.

Student: ______________________ File Code: 77.04.05.00.A2-2

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UNIT PRETEST: TELEVISION SWEEP SECTION TROUBLES

77.04.05.01.

1. The section of the sync separator that removes the vertical sync pulse is the:

   A. horizontal phase inverter.
   B. vertical integrator.
   C. vertical-sync amp.
   D. horizontal differentiator.

2. What is the proper title for the black bar which runs horizontally across the picture?

   A. horizontal sync pulse.
   B. vertical blanking bar.
   C. horizontal blanking bar.
   D. sync pulse.

3. If a problem exists in the sync-separator circuit, the symptoms will be:

   A. horizontal rolling only.
   B. no A.G.C.
   C. vertical rolling only.
   D. vertical and horizontal rolling.

4. The horizontal and vertical sync pulses are used by which of the following circuits to lock the picture in with the station?

   A. video
   B. sync separator
   C. sweep circuit
   D. differentiator circuit

5. What section of a T.V. separates the sync pulse from the video signal?

   A. sync amp
   B. I.F. amp
   C. sync separator
   D. A.G.C.

77.04.05.02.

6. The control used to adjust the vertical stability is the:

   A. vertical hold control.
   B. horizontal hold control.
   C. A.G.C. control
   D. vertical height control.

7. The control used to adjust the horizontal stability is the:

   A. horizontal width control.
   B. A.G.C. delay.
   C. vertical hold control.
   D. horizontal hold control.

8. Which stage of a T.V. is responsible for sorting out sync pulses?

   A. I.F. amp
   B. sync separator
   C. sync amplifier
   D. horizontal A.F.C.

9. There is a normal raster with a good amount of contrast but the audio is buzzing and the video is distorted, where is the problem?

   A. A.G.C.
   B. Second I.F. amp
   C. sync separator
   D. video output

10. The sync separator gets its pulse from the:

    A. video amp.
    B. A.G.C. pulse.
    C. third I.F. amp.
    D. first I.F. amp.

77.04.05.03.

11. Both the raster and video are normal, but there is no audio and no hum after the speaker has been checked and found to be o.k., which section should the serviceman then troubleshoot?

    A. audio I.F.
    B. audio output
    C. audio detector
    D. video amp

12. If the sync separator fails, the picture will:

    A. lose A.G.C. control.
    B. roll vertically.
    C. roll horizontally.
    D. roll vertically and horizontally.

13. If the sync separator fails, what affect will this have on the audio?

    A. The audio will disappear.
    B. distortion
    C. none
    D. The audio will increase in volume.

14. The raster is normal, but the video is gone. The audio is very weak, but the volume control has some effect. Where might the problem be?

    A. A.G.C.
    B. third I.F. amp
    C. video amp
    D. sync separator

15. The audio is normal, but both the raster and video are missing. What might cause this problem?

    A. malfunctioning video output
    B. bad picture tube
    C. bad video amp
    D. bad sync separator

77.04.05.04.

16. The sync separator gets its pulse from the:

    A. video amp.
    B. A.G.C. pulse.
    C the first I.F. amp.
    D. the third I.F. amp.

17. What part of the horizontal section keeps the picture locked in?

    A. horizontal hold control
    B. vertical sync
    C. oscillator circuit
    D. A.F.C. circuit

18. If a T.V. set has its picture more from top to bottom and cannot be stopped, what might be the trouble?

    A. vertical sync amp
    B. damage to the horizontal sync
    C. malfunctioning sync amp
    D. bad sync separator

19. If the sync separator fails, what effect will this have on the audio?

    A. distortion
    B. none
    C. it will increase
    D. the audio will disappear

20. Why can't the vertical sweep retrace line be seen on the screen?

    A. It blends with horizontal lines.
    B. It's too fast to be seen.
    C. It blends with the vertical lines.
    D. The picture is blanked out.

77.04.05.05.

21. What is another term for the vertical-integrator circuit in the sync section of a T.V. set?

    A. a bank-pass filter
    B. a high-pass filter
    C. a low-pass filter
    D. a low frequency amp

22. What turns on the sync separator stage in most T.V. sets?

    A. sync pulse
    B. power supply
    C. T.V. station
    D. vertical blanking bar

23. What do many technicians call the vertical blanking bar on a T.V. screen?

    A. vertical burst
    B. vertical hammer-head
    C. vertical back-porch
    D. vertical sync pulse

24. What is the scope frequency of the vertical sync pulse?

    A. 15,750 HZ
    B. 41.25 MHZ
    C. 60 HZ
    D. 455 KC

25. When troubleshooting, what should be checked after the voltage in the sync separator is checked?

    A. resistance
    B. waveform
    C. inductance
    D. capacitance

77.04.05.06.

26. Where is the vertical-sync amp physically located in a solid state T.V. set?

    A. In the phase inverter.
    B. Right after the sync separator.
    C. Before the sync separator.
    D. In the vertical sweep circuit.

27. The raster is normal, but there is a buzz in the sound and an excess amount of contrast. Where is the problem?

    A. third I.F. amp
    B. first I.F. amp
    C. F. amp
    D. A.G.C.

28. What is defined as the processes and signals which cause the picture to be scanned vertically?

    A. vertical sweep
    B. vertical hold control
    C. vertical sync
    D. vertical flyback or retrace

29. If the vertical hold controls the movement of the picture in a T.V. which has lost its vertical sync, this tells the technician that:

    A. the vertical sync amp is working.
    B. the vertical sync separator is operating.
    C. the vertical sweep circuit is operating.
    D. the vertical blanking circuit is operating.

30. If the raster is normal, but the video displays excess snow and the audio is quite noisy, what can be at fault?

    A. R.F. amp
    B. mixer
    C. oscillator
    D. A.G.C.

77.04.05.07.

31. The sound and raster are normal, but the picture is rolling. What might be the problem?

    A. vertical sync amp
    B. horizontal A.F.C.
    C. sync separator
    D. local oscillator

32. What can be used as a valuable indication that the vertical-sync section is operating?

    A. sync-generator
    B. VOM
    C. the hammerhead pattern
    D. oscilloscope

33. The raster is normal, but the video is missing and there is some noise in the sound. What might be the malfunctioning section?

    A. local oscillator
    B. mixer
    C. R.F. amp
    D. first I.F. amp

34. A T.V. set has normal raster and video, but no audio and no hum. What section might be at fault?

    A. volume control
    B. audio detector
    C. video output
    D. audio output

35. A T.V. set has both normal sound and raster, but the video is floating. Where does the problem exist?

    A. horizontal A.F.C.
    B. sync amp
    C. vertical sync amp
    D. sync separator

77.04.05.08.

36. Where is the vertical-sync amp physically located in a solid-state T.V. set?

    A. before the sync separator
    B. right after the sync separator
    C. vertical sweep circuit
    D. in the phase inverter

37. What is the scope frequency of the vertical sync pulse?

   A. 455 KC
   B. 41.25 MHZ
   C. 60 HZ
   D. 15.750 HZ

38. Where does the sync separator get its pulse from?

   A. A.G.C.
   B. third I.F. amp
   C. horizontal A.F.C.
   D. video amp

77.04.05.09.

39. The vertical sync pulse is prevented from entering the horizontal section by the:

   A. weakness of the signal.
   B. horizontal differentiator circuit.
   C. phase inverter circuit.
   D. transformer action.

40. What does the phase inverter do to the signal of the horizontal circuit?

   A. changes the frequency
   B. smooths the pulse
   C. amplifies the signal
   D. converts a positive wave into a negative wave

77.04.05.10.

41. What component do most T.V. manufacturers use for A.F.C. control in a T.V. set?

   A. a capacitor PI network
   B. RC network
   C. RL network
   D. diode

42. What generates the sweep signal in the horizontal section of a T.V. set?

   A. damper
   B. output
   C. A.F.C. circuit
   D. oscillator

43. How does a horizontal A.F.C. keep the oscillator on frequency?

    A. By the sync separator pulses.
    B. By using the pulse from the vertical integrator.
    C. By using the voltage from the power supply.
    D. By using a feedback circuit.

77.04.05.11.

44. What circuit keeps the horizontal oscillator on frequency in a T.V. set?

    A. output circuit
    B. damper circuit
    C. sync circuit
    D. A.F.C. circuit

45. The sound and raster are normal in a T.V., but the picture is full of lines. What section should be checked?

    A. vertical retrace lines
    B. vertical oscillator
    C. horizontal oscillator
    D. horizontal yoke assembly

77.04.05.12.

46. The most common cause of poor linearity in a T.V. is a bad:

    A. capacitor.
    B. resistor.
    C. tube.
    D. power supply.

47. What component do most T.V. manufacturers use for A.F.C. control in a T.V. set?

    A. a capacitor pi network
    B. RC network
    C. RL network
    D. diode

48. If the horizontal oscillator is severely off frequency and the oscillator checks out okay, what other section should be checked first?

    A. A.F.C.
    B. sync-separator
    C. horizontal differentiator
    D. vertical sync amp

49. What is the frequency of the vertical sweep?

A. 455 KC
B. 15,750 Hz
C. 41.25 MHz
D. 60 Hz

50. Poor picture height in a T.V. is caused by either the output stage or:

A. a low vertical-sync pulse.
B. a weak vertical oscillator drive.
C. too high power supply voltage.
D. loss of horizontal sync pulse.

77.04.05.13.

51. The most common cause of poor linearity in a T.V. is a malfunctioning:

A. capacitor.
B. tube.
C. resistor.
D. power supply.

52. A loss of horizontal sweep will result in:

A. a keystone picture.
B. poor width.
C. a thin white line running horizontally on the picture.
D. a thin white line running vertically on the screen.

53. What is the frequency of the vertical-sweep section?

A. 455 KC
B. 60 HZ
C. 41.25 MHZ
D. 15,750 HZ

54. Which area of the picture does the vertical height control primarily effect?

A. bottom
B. top
C. right side
D. left side

55. If a stage fails completely in the horizontal section of a T.V., what will be the overall effect?

A. no video
B. no audio
C. no linearity
D. no raster

77.04.05.14.

56. A T.V. is displaying people with short legs and long heads. What should be adjusted?

    A. yoke
    B. vertical height
    C. vertical linearity
    D. damper

57. The output of the vertical driver stage goes to the:

    A. vertical oscillator.
    B. yoke.
    C. vertical output.
    D. horizontal A.F.C..

58. The circuit which produces the deflection signal is the:

    A. vertical oscillator.
    B. vertical output.
    C. vertical-sync pulse.
    D. vertical A.F.C..

59. The extent to which a picture fills the screen vertically is defined as:

    A. vertical height.
    B. vertical linearity.
    C. vertical output.
    D. vertical oscillator.

60. If the horizontal oscillator ceases to function, what will happen to the picture?

    A. It will shrink.
    B. It will disappear.
    C. It will be keystone in shape.
    D. nothing

77.04.05.15.

61. A T.V. has no raster, but good audio. After discovering the CRT to be all right, what should be checked next?

    A. yoke
    B. vertical sweep
    C. power supply
    D. horizontal output

62. A T.V.'s raster is normal, but both the video and audio are weak. What section should the repairman troubleshoot?

A. video output
B. antenna
C. I.F. amp
D. R.F. amp

63. If a raster is normal with no video and no volume, but the volume control has some effect, the malfunctioning section is the:

A. R.F. amp.
B. tuner oscillator.
C. video amp.
D. tuner mixer.

64. A T.V. has normal audio and raster, but the video is shrunk at both the top and the bottom. What section is bad?

A. vertical sweep
B. sync-separator
C. horizontal output
D. yoke

65. The audio and raster are normal, but the video is floating in the picture. What is the malfunctioning section?

A. vertical separator
B. sync-separator
C. A.G.C.
D. R.F. amp

77.04.05.16.

66. Which section of the horizontal circuit will affect the horizontal linearity?

A. A.F.C.
B. Damper
C. Oscillator
D. Output

67. The vertical linearity control primarily effects the:

A. right side of the screen.
B. bottom of the screen.
C. left side of the screen.
D. top of the screen.

68. If the vertical sweep is completely lost, the picture will look like:

A. a blank screen.
B. a snowy screen.
C. a thin, white horizontal line.
D. a thin, white vertical line.

69. Why is the frequency of both the horizontal output transformer and the yoke so high?

A. To match the frequency being transmitted.
B. To build up enough high voltage.
C. because of the high retrace time needed.
D. To keep each other in sync.

70. If a stage fails completely in the horizontal section of a T.V., what will be the overall effect?

A. no linearity
B. no raster
C. no audio
D. no video

77.04.05.17.

71. The raster is normal with weak sound and video. There is also a lot of snow in the picture. What section should the repairman troubleshoot?

A. local oscillator
B. R.F. amp
C. third I.F. amp
D. A.G.C.

72. The sound and raster are normal, but there is no video. There is some change when the contrast control is varied. What section is malfunctioning?

A. video output
B. third I.F. amp
C. video detector
D. video amp

73. A T.V. has a normal raster and video, but no sound. There is no background or hum. What section of the audio should be checked?

A. output
B. I.F.
C. detector
D. trap

74. A T.V. has lost its vertical sync and the hammerhead pattern is missing. The video I.F. has been checked and found to be O.K. What should be checked next?

A. video amp
B. R.F. amp
C. A.G.C.
D. vertical sweep

75. A T.V. set has lost vertical sync, but a normal hammerhead pattern is seen. What section should be checked?

A. A.G.C.
B. sync separator
C. vertical output
D. vertical sync amp

77.04.05.18.

76. The video and raster are normal, but the sound is dead. The background noise varies with the volume control. What section should be checked?

A. sound trap
B. sound detector
C. video amp
D. audio output

77. The raster is normal, but both the audio and video are missing. What section should be checked?

A. A.G.C.
B. R.F. amp
C. video detector
D. first I.F. amp

78. The horizontal section will not sync, and the oscillator will not pass through sync. What should be checked?

A. damper
B. sync separator
C. yoke
D. horizontal oscillator

79. The audio is normal, but the video and raster are dim. What section is bad?

A. CRT
B. video output
C. video amp
D. horizontal sweep

80. The raster is normal, but there is no audio or video. There is some atmospheric sound. What section should be checked?

A. local oscillator in tuner
B. first I.F. amp
C. A.G.C.
D. video detector

77.04.05.19.

81. The output of the vertical driver stage goes to the:

A. yoke.
B. vertical oscillator.
C. vertical output.
D. horizontal A.F.C..

82. A loss of horizontal sweep will result in:

A. a thin, white line running horizontally on the screen.
B. a thin, white line running vertically on the screen.
C. a keystone picture.
D. poor width.

83. How does a damper failure affect the raster?

A. The raster will increase in brightness.
B. It will oscillate.
C. no affect
D. It will disappear.

84. What will the raster look like on a T.V. if the yoke fails?

A. keystone or trapezoidal
B. It will shrink on all four sides.
C. It will have black hum bars.
D. no raster

85. If the horizontal oscillator ceases to function, what will happen to the picture?

A. nothing
B. It will shrink.
C. It will be keystone in shape.
D. It will disappear.

77.04.05.20.

86. The most common cause of poor linearity in a T.V. is a malfunctioning:

A. tube.
B. resistor.
C. capacitor.
D. power supply.

87. If the horizontal oscillator is severely off of frequency and the oscillator checks out o.k., what other section should be immediately checked?

    A. A.F.C.
    B. sync separator
    C. horizontal differentiator
    D. vertical sync amp

88. The audio and raster on a T.V. are normal, but the video is missing. The video amp checks o.k.. What should be checked next?

    A. horizontal output
    B. picture tube
    C. A.G.C.
    D. first I.F. amp

89. The raster is normal, but the video is missing. The audio is weak, but the volume control has some effect. Where might the problem be?

    A. video amp
    B. third I.F. amp
    C. A.G.C.
    D. sync separator

90. The audio is normal but both the raster and video are missing. What might cause this problem?

    A. bad video amp
    B. bad video output
    C. bad CRT
    D. bad sync separator

UNIT PRETEST ANSWER KEY: TELEVISION SWEEP SECTION TROUBLES

LAP 01	1.	B
	2.	B
	3.	D
	4.	C
	5.	C
LAP 02	6.	A
	7.	D
	8.	B
	9.	A
	10.	A
LAP 03	11.	B
	12.	D
	13.	C
	14.	C
	15.	B
LAP 04	16.	A
	17.	D
	18.	A
	19.	B
	20.	D
LAP 05	21.	C
	22.	A
	23.	B
	24.	C
	25.	B
LAP 06	26.	B
	27.	D
	28.	A
	29.	C
	30.	A
LAP 07	31.	A
	32.	C
	33.	A
	34.	C
	35.	D
LAP 08	36.	B
	37.	C
	38.	D
LAP 09	39.	B
	40.	D
LAP 10	41.	D
	42.	D
	43.	D
LAP 11	44.	C
	45.	C
LAP 12	46.	A
	47.	D
	48.	A
	49.	D
	50.	B
LAP 13	51.	A
	52.	D
	53.	B
	54.	A
	55.	D
LAP 14	56.	C
	57.	C
	58.	A
	59.	A
	60.	B
LAP 15	61.	D
	62.	C
	63.	C
	64.	A
	65.	B
LAP 16	66.	D
	67.	D
	68.	C
	69.	C
	70.	B
LAP 17	71.	B
	72.	D
	73.	A
	74.	C
	75.	D
LAP 18	76.	B
	77.	C
	78.	D
	79.	A
	80.	A
LAP 19	81.	C
	82.	B
	83.	D
	84.	A
	85.	D
LAP 20	86.	C
	87.	A
	88.	B
	89.	A
	90.	C

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: The Sync Section

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the sync separator section of a television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Photofact Television Course by Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 10 in An Entry Into T.V. Servicing.
2. Answer the following review questions for Chapter 10: 2, 6, 11 and 14.
3. Read Chapter 10, "Sync-Pulse Separation, Amplification and Control," in Photofact Television Course.
4. Answer the questions at the end of Chapter 10.
5. Check your answers with the answer key.
6. Take the LAP test.

Principal Author(s): P. Schuster & R. Arneson
B. Vetter

Student: ____________________ **File Code:** 77.04.05.01.A2-2

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Glasgow AFB, Montana 59231

LAP TEST: THE SYNC SECTION

1. What part of the horizontal keeps the picture locked in?

   a. oscillator circuit
   b. horizontal hold control
   c. A.F.C. circuit
   d. vertical sync

2. If the picture rolls from left to right across the screen, what section might be causing the trouble?

   a. vertical sync
   b. sync separator
   c. horizontal sync
   d. vertical sync amp

3. What is transmitted from a station to lock the picture both vertically and horizontally?

   a. video
   b. sync pulse
   c. horizontal sync
   d. vertical sync

4. What removes the horizontal sync pulse in the sync separator?

   a. horizontal A.F.C.
   b. sync amp
   c. horizontal differentiator
   d. horizontal phase inverter

5. What piece of test equipment should be used to check the sync separator?

   a. an ammeter
   b. an oscilloscope
   c. a V.O.M.
   d. a signal generator

6. If a T.V. set's picture moves from top to bottom and cannot be stopped, what might be the trouble?

   a. damage to the horizontal sync
   b. malfunctioning sync amp
   c. vertical sync failure
   d. bad sync separator

7. The section of the sync separator that removes the vertical sync pulse is the:

   a. vertical integrator
   b. horizontal phase inverter
   c. horizontal differentiator
   d. vertical-sync amp

8. The horizontal and vertical sync pulses are used by which of the following circuits to lock the picture in with the station?

   a. differentiator circuit
   b. video
   c. sweep circuit
   d. sync separator

9. What is the proper title for the black bar which runs horizontally across the picture?

   a. horizontal sync pulse
   b. vertical blanking bar
   c. horizontal blanking bar
   d. sync pulse

10. When a technician is able to vary the picture with the horizontal hold control, this tells him that:

    a. a vertical sync problem exists
    b. a vertical sweep problem exists
    c. there is not a sweep problem
    d. a sweep problem exists

LAP TEST ANSWER KEY: THE SYNC SECTION

1. C
2. C
3. B
4. C
5. B
6. C
7. A
8. C
9. B
10. C

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Horizontal & Vertical Sync Sections

OBJECTIVE:

Identify characteristics of a sync section in solid state television receivers.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test about this LAP.

RESOURCES:

Transistor TV Training Course by Middleton

PROCEDURE:

1. Read Chapter 6, "Horizontal- and Vertical-Sync Sections," in the above resource.
2. Answer the review questions at the end of Chapter 6.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.05.02.A2-2

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Family Education Program

LAP TEST: HORIZONTAL AND VERTICAL SYNC SECTIONS

1. What two devices may be used as clipping devices in a transistor sync section?

   a. diode and resistor
   b. transistor and resistor
   c. transistor and diode
   d. transistor and capacitor

2. A clipping device is commonly ________ and operates in a Class C operation.

   a. reversed-biased
   b. forward-biased
   c. a sync separator
   d. a transistor/diode

3. How many basic methods are employed in sync-separator circuitry to reduce the amplitude of noise pulsed in the sync train?

   a. 4
   b. 6
   c. 5
   d. 3

4. Why do many transistor receivers use at least two sync separator stages?

   a. for base cut off
   b. for collector saturation on weak signals
   c. for collector saturation on strong signals
   d. for clipping of the sync signals

5. A noise switch is a diode or transistor that is operated solely as a ________.

   a. sync clipper
   b. sync driver
   c. voltage divider
   d. noise clipper

6. A solid state noise switch is normally biased:

   a. just above cut off
   b. just below cut off
   c. at cut off to pass the sync pulse
   d. at cut off to cancel noise

7. Why can't horizontal sync pulses and equalizing pulses build up an appreciable output voltage from an integrator?

   a. too wide a pulse
   b. too narrow a pulse
   c. they are clipped
   d. too well filtered

8. Equalizing pulses have only ______ the width of a horizontal sync pulse.

   a. 1/4
   b. 3/4
   c. 2/3
   d. 1/2

9. Why is it desirable to locate the sync takeoff point in a video amplifier at a high level point?

   a. for proper age action
   b. less amplification is necessary in the sync section
   c. not to overdrive the vertical intergrator
   d. proper time constant for the horizontal sync pulse

10. What is a large disadvantage in using a diode as a limiter vs. a transistor?

    a. no amplification
    b. poor cutoff
    c. easily saturated
    d. can't withstand much heat

LAP TEST ANSWER KEY: HORIZONTAL AND VERTICAL SYNC SECTIONS

1. C
2. A
3. C
4. B
5. D
6. A
7. B
8. D
9. B
10. A

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Sync Separator Failure

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a television set, identify the sync separator circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Sync Separator Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 10 in the response manual.
2. Complete the Practice Exercises for Lesson 10.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Symptoms of Sync Separator Troubles

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the sync separator section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop No. 10, Sync Separator Problems.

Projector.

PROCEDURE:

1. View Film Loop No. 10 as indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vette

Student: ______________________ **File Code:** 77.04.05.03.A2-2
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LAP TEST: SYNC SEPARATOR FAILURE/ SYMPTOMS OF SYNC SEPARATOR TROUBLES

77.04.05.03

1. The control used to adjust the vertical stability is the:

   a. horizontal hold control
   b. vertical height control
   c. vertical hold control
   d. A.G.C. control

2. There is a normal raster with a good amount of contrast, but the audio is buzzing and the video is distorted. Where is the problem?

   a. second I.F. amp
   b. A.G.C.
   c. sync separator
   d. video output

3. A T.V. has some hum, but no audio or video. The raster and video circuitry check o.k. What section should be troubleshot next?

   a. second I.F. amp
   b. third I.F. amp
   c. first I.F. amp
   d. A.G.C. control

4. Which stage of a T.V. is responsible for sorting out sync pulses?

   a. sync separator
   b. sync amplifier
   c. horizontal A.F.C.
   d. I.F. amp

77.04.05.04

5. Both the sound and the raster are normal, but the video is floating in the picture. Where should the technician begin to troubleshoot?

   a. vertical sweep
   b. video amp
   c. sync separator
   d. A.G.C.

6. There is no audio, but a loud noise is heard. There is no video, but a good deal of snow appears on the screen. The raster is normal. Where does this problem exist?

   a. mixer
   b. first I.F. amp
   c. oscillator
   d. R.F. amp

7. Both the audio and raster are normal, but the video is gone. The video section was found to be o.k. What else might be causing this problem?

   a. A.G.C.
   b. third I.F. amp
   c. picture tube
   d. sync separator

8. The raster and sound are normal, but the picture rolls up and down. What section should be checked first?

   a. horizontal A.F.C.
   b. horizontal sync amp
   c. vertical sync amp
   d. sync separator

9. Both the raster and video are normal, but there is no audio and no hum after the speaker has been checked and found to be o.k. Which section should the serviceman then troubleshoot?

   a. audio output
   b. audio detector
   c. audio I.F.
   d. video amp

10. The raster is normal, but the video is gone. The audio is very weak, but the volume control has some effect. Where might the problem be?

    a. sync separator
    b. video amp
    c. third I.F. amp
    d. A.G.C.

77.04.05.03.A2-2
77.04.05.04.A2-2

LAP TEST ANSWER KEY: SYNC SEPARATOR FAILURE/ SYMPTOMS OF SYNC SEPARATOR TROUBLES

LAP 03

1. C
2. B
3. B
4. A

LAP 04

5. C
6. D
7. C
8. C
9. A
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Sync Separator Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the sync separator section of a television set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on the unit performance test.

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
Oscilloscope
Soldering and desoldering irons and tools
TSD trainer or television set
Television Analyst, B & K Model 1077B
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have the instructor verify it.
5. After instructor verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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LAP TEST: DIAGNOSING SYNC SEPARATOR TROUBLES

1. Why can't the vertical sweep retrace line be seen on the screen?

   a. it blends with horizontal lines.
   b. it's too fast to be seen
   c. it blends with the vertical lines
   d. the picture is blanked out

2. The control used to adjust the horizontal stability is the:

   a. A.G.C. delay
   b. horizontal width control
   c. vertical hold control
   d. horizontal hold control

3. If a T.V. set has its picture more from top to bottom and cannot be stopped, what might be the trouble?

   a. vertical sync amp
   b. damage to the horizontal sync
   c. bad sync separator
   d. malfunctioning sync amp

4. What piece of test equipment should be used to check the sync separator?

   a. a scope
   b. a signal generator
   c. a VTVM
   d. a VOM

5. The section of the sync separator that removes the vertical sync is the:

   a. horizontal phase invertor
   b. vertical integrator
   c. vertical sync amp
   d. horizontal differentiator

6. What causes the picture to roll left to right across the screen?

   a. vertical sync
   b. sync separator
   c. horizontal sync
   d. vertical sync amp

7. If the sync separator fails, what affect will this have on the audio?

   a. it will increase
   b. distortion
   c. none
   d. the audio will disappear

8. What part of the horizontal section keeps the picture locked in?

   a. horizontal hold control
   b. A.F.C. circuit
   c. oscillator circuit
   d. vertical sync

9. The sync separator gets its pulse from the:

   a. first I.F. amp
   b. video amp
   c. A.G.C. pulse
   d. third I.F. amp

10. The audio is normal, but both the raster and video are missing. What might cause this problem?

    a. bad video output
    b. bad picture tube
    c. bad video amp
    d. bad sync separator

LAP TEST ANSWER KEY: DIAGNOSING SYNC SEPARATOR TROUBLES

1. D
2. D
3. A
4. A
5. B
6. C
7. C
8. B
9. B
10. B

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Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Television Sync Problems

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the vertical sync section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 10, Pages 75-79, in the above resource.
2. Answer the following review questions in Chapter 10: 1, 3, 5, 7, 8, 15 and 16.
3. Check answers with the answer key.
4. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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LAP TEST: TELEVISION SYNC PROBLEMS

1. What do many technicians call the vertical blanking bar on a T.V. screen?

   a. vertical back-porch
   b. vertical hammer-head
   c. vertical burst
   d. vertical sync pulse

2. What is another term for the vertical-integrator circuit in the sync section of a T.V. set?

   a. a bank-pass filter
   b. a low frequency amp
   c. a low-pass filter
   d. a high-pass filter

3. What is the scope frequency of the vertical sync pulse?

   a. 60 HZ
   b. 455 KC
   c. 41.25 MHZ
   d. 15,750 HZ

4. How much peak-to-peak voltage is found in the average sync section of a T.V.?

   a. 8 V
   b. .1 V
   c. 10 V
   d. .6 V

5. When troubleshooting, what should be checked after the voltage in the sync separator is checked?

   a. capacitance
   b. inductance
   c. resistance
   d. waveform

6. Where does the sync separator get its pulse from?

   a. the third I.F. amp
   b. the video amp
   c. the horizontal A.F.C.
   d. the A.G.C.

7. Why is it not possible to view the vertical blanking bar on some T.V. sets?

   a. the contrast control cannot make it light enough
   b. it can only be viewed on black and white sets
   c. it can only be seen on color sets
   d. the T.V. station does not broadcast it all the time

8. What is the frequency of the signal pulse coming from the sync separator going to the sync amp in the sync section of a T.V.?

   a. 15,750 HZ
   b. 41.25 HZ
   c. 455 HZ
   d. 60 HZ

9. Does the sync separator have any affect on the audio?

   a. occasionally
   b. no
   c. yes
   d. possibly

10. What turns on the sync separator stage in most T.V. sets?

    a. power supply
    b. vertical blanking bar
    c. T.V. station
    d. sync pulse

LAP TEST ANSWER KEY: TELEVISION SYNC PROBLEMS

1. B
2. C
3. A
4. C
5. D
6. B
7. A
8. A
9. B
10. D

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Learning Activity Package

Student: ______

Date: ______

PERFORMANCE ACTIVITY: Loss of Vertical Sync

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, identify the vertical sync circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Vertical Sync Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 11 in the response manual.
2. Complete the Practice Exercise for Lesson 11.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arnesoh, B. Vetter

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Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Symptoms of Vertical Sync Troubles

OBJECTIVES:

Observe typical symptoms commonly related to malfunctions in the vertical sync section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheets.
Television Symptom Diagnosis: Student Response Manual, Tinnell.

Film Loop No. 11, Loss of Vertical Sync.

Projector.

PROCEDURE:

1. View Film Loop No. 11 indicated in the resources and complete the activities indicated in the film loop.
2. Check your answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________

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LAP TEST: LOSS OF VERTICAL SYNC/ SYMPTOMS OF VERTICAL SYNC TROUBLES

77.04.05.07

1. What is defined as the processes and signals which cause the picture to be scanned vertically?

   a. vertical hold control
   b. vertical flyback or retrace
   c. vertical sweep
   d. vertical sync

2. Where is the vertical sync amp physically located in a solid-state T.V. set?

   a. right after the sync separator
   b. in the vertical sweep circuit
   c. in the phase inverter
   d. before the sync separator

3. The raster is normal, but there is a buzz in the sound and an excess amount of contrast. Where is the problem?

   a. A.G.C.
   b. first I.F. amp
   c. third I.F. amp
   d. F. amp

4. What stage of the sync section is found in most solid-state T.V. sets?

   a. vertical output driver
   b. vertical sync stop
   c. vertical sync amp
   d. transformed coupling circuit

5. If a T.V. set has a distorted raster, this would indicate a malfunctioning:

   a. CRT
   b. sync separator
   c. video
   d. power supply

77.04.05.08

6. A T.V. set has normal raster and video, but no audio and no hum. What section might be at fault?

   a. volume control
   b. video output
   c. audio detector
   d. audio amp

7. The sound and raster are normal, but the picture is rolling. What might be the problem?

   a. sync separator
   b. horizontal A.F.C.
   c. local oscillator
   d. vertical sync amp

8. The raster is normal, but the video is missing and there is some noise in the sound. What might be the malfunctioning section?

   a. local oscillator
   b. first I.F amp
   c. mixer
   d. R.F. amp

9. A T.V. set has both normal sound and raster, but the video is floating. Where does the problem exist?

   a. sync separator
   b. sync amp
   c. horizontal A.F.C.
   d. vertical sync amp

10. What can be used as a valuable indication that the vertical sync section is getting a signal?

   a. sync generator
   b. VOM
   c. the hammerhead pattern
   d. oscilloscope

LAP TEST ANSWER KEY: LOSS OF VERTICAL SYNC/ SYMPTOMS OF VERTICAL SYNC TROUBLES

LAP 07

1. C
2. A
3. A
4. C
5. D

LAP 08

6. D
7. D
8. A
9. A
10. C

File Code: 77.04.05.09.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Vertical Sync Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the vertical sync section of a TV set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "The Horizontal Sync" LAP test and is taken after completing that LAP.

Diagnosis and repair skills are evaluated on the unit performance test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst, B & K Division of Dynascan Corp.

TSD Trainer
Television set
Television Analyst, B & K Model 1077B
Hand tools
Oscilloscope
Soldering & desoldering irons and tools
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Read "Vertical Grid Drive Signal and Vertical Solid State Sweep Drive," on Page 37 in Instruction Manual for Model 1077 Television Analyst.
3. Diagnose the receiver using the television analyst.
4. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
5. Locate the malfunction(s) and have it verified by the instructor.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

PROCEDURE: (continued)

6. When verified, correct the malfunction(s).

7. Proceed to the next LAP.

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: The Horizontal Sync

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the horizontal sync section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.
Transistor TV Training Course by Middleton.

PROCEDURE:

1. Read Chapter 10 in An Entry Into TV Servicing.
2. Answer the following questions at the end of Chapter 10: 4, 9, 10, 12, 13, 17 and 18.
3. Check your answers with the answer key.
4. Read Chapter 8, "Horizontal-AFC and Oscillator Sections," in the Transistor TV Training Course.
5. Answer the review questions at the end of Chapter 8.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.05.09.A2-2
77.04.05.10.A2-2

Date: ____________________ Date Published: 11-29-77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: DIAGNOSING VERTICAL SYNC TROUBLES AND THE HORIZONTAL SYNC

77.04.05.09

1. What is the frequency of the signal pulse coming from the sync separator going to the sync amp in the sync section of a T.V. set?

   a. 15,750 HZ
   b. 455 HZ
   c. 41.75 HZ
   d. 60 HZ

2. What can be used as a valuable indication that the vertical sync section is operating?

   a. VOM
   b. sync generator
   c. oscilloscope
   d. the hammerhead pattern

3. The raster is normal, but there is a buzz in the sound and an excessive amount of contrast. Where is the problem?

   a. A.G.C.
   b. first I.F. amp
   c. R.F. amp
   d. third I.F. amp

4. What is another term for the vertical integrator circuit in the sync section of a T.V. set?

   a. a low-pass filter
   b. a high-pass filter
   c. a low frequency amp
   d. a band-pass filter

5. What is the scope frequency of the horizontal sync pulse?

   a. 15,750 HZ
   b. 455 HZ
   c. 60 HZ
   d. 41.75 MHZ

6. Where is the vertical-sync amp physically located in a solid-state T.V. set?

   a. in the phase inverter
   b. right after the sync separator
   c. vertical sweep circuit
   d. before the sync separator

7. If the raster is normal, but the video displays excess snow and the audio is noisy, what section is bad?

   a. mixer
   b. R.F. amp
   c. A.G.C.
   d. oscillator

8. Where does the sync separator get its pulse from?

   a. A.G.C.
   b. horizontal A.F.C.
   c. third I.F. amp
   d. video amp

77.04.05.10

9. What is the scope frequency of the horizontal sync pulse?

   a. 455 HZ
   b. 15,750 HZ
   c. 60 HZ
   d. 41.75 MHZ

10. What is another term for the horizontal differentiator in the sync system?

    a. a low-pass filter
    b. high-pass filter
    c. a band-stop filter
    d. a band-pass filter

77.04.05.09.A2-2
77.04.05.10.A2-2

LAP TEST ANSWER KEY: DIAGNOSING VERTICAL SYNC TROUBLES AND THE HORIZONTAL SYNC

LAP 09

1. A
2. D
3. A
4. A
5. A
6. B
7. B
8. D

LAP 10

9. B
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Loss of Horizontal Sync

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, identify the horizontal sync circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Horizontal Sync Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 13 in the response manual.
2. Complete the Practice Exercises for Lesson 13.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77.04.05.12.A2-0

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Symptoms of Horizontal Sync Troubles

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the horizontal sync section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Horizontal Sync Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Film Loop No. 13, Loss of Horizontal Sync.

Projector.

PROCEDURE:

1. View Film Loop No. 13 indicated in the resources and complete the activities indicated in the film loop.
2. Check your activity answers with the answer key.
3. Go to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Horizontal Sync Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the horizontal sync section of a TV set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

Diagnosis and repair skills are evaluated on a unit performance test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

TSD trainer or television set
Hand tools
Soldering & desoldering tools
Oscilloscope
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.

2. Diagnose the television receiver for possible malfunction(s).

3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.

4. Locate the malfunction(s) and have the instructor verify it.

5. After verification, correct the malfunction(s).

6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.05.11.A2-2
77.04.05.12.A2-2
77.04.05.13.A2-2

Date: ____________________ Date Published: 11-29-77

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LAP TEST: LOSS OF HORIZONTAL SYNC/SYMPTOMS OF HORIZONTAL SYNC TROUBLES/DIAGNOSING HORIZONTAL SYNC TROUBLES

77.04.05.11

1. What component do most T.V. manufacturers use for A.F.C. control in T.V. sets?

   a. RL networks
   b. a capacitor PI network
   c. diodes
   d. RC networks

2. What is the frequency of the horizontal oscillator?

   a. 455 HZ
   b. 15,750 HZ
   c. 60 NZ
   d. 41.75 HZ

3. What generates the sweep signal in the horizontal section of a T.V. set?

   a. A.F.C. circuit
   b. oscillator
   c. damper
   d. output

77.04.05.12

4. What circuit keeps the horizontal oscillator on frequency in a T.V. set?

   a. sync circuit
   b. A.F.C. circuit
   c. output circuit
   d. damper circuit

5. The sound and raster are normal, but the picture is full of lines. What section should be checked?

   a. horizontal oscillator
   b. yoke assembly
   c. vertical retrace lines
   d. vertical oscillator

6. If the horizontal oscillator is severly off frequency and the oscillator checks out o.k. What other section should be immediately checked?

   a. vertical sync amp
   b. A.F.C
   c. horizontal differentiator
   d. sync separator

7. The sound and raster are normal in a T.V., but the picture is full of lines. What section should be checked?

   a. horizontal yoke assembly
   b. vertical retrace lines
   c. vertical oscillator
   d. horizontal oscillator

77.04.04.13

8. The most common cause of poor linearity in a T.V. is a bad:

   a. resistor
   b. capacitor
   c. tube
   d. power supply

9. Poor picture height in a T.V. is caused by either the output stage or:

   a. too high power supply voltage
   b. loss of horizontal sync pulse
   c. a low vertical sync pulse
   d. a weak vertical oscillator drive

10. What is the frequency of the vertical sweep?

    a. 60 HZ
    b. 15.750 HZ
    c. 41.25 MHZ
    d. 455 KC

LAP TEST ANSWER KEY: LOSS OF HORIZONTAL SYNC/SYMPTOMS OF HORIZONTAL SYNC TROUBLES/DIAGNOSING HORIZONTAL SYNC TROUBLES

LAP 11

1. C
2. B
3. B

LAP 12

4. B
5. A
6. B
7. D

LAP 13

8. B
9. D
10. A

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Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Picture Sweep Failure

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the picture sweep section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 11 in the above resource.
2. Answer the review questions for Chapter 11.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ **File Code:** 77.04.05.14.A2-2

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LAP TEST: PICTURE SWEEP FAILURE

1. What is the most common cause of reduced picture height?

   a. low power
   b. weak tubes
   c. low horizontal drive
   d. poor sync

2. What will the T.V. picture look like if the yoke shorts?

   a. keystone or trapezoidal
   b. it will have block hum bars
   c. it will shrink on all four sides
   d. no raster

3. A loss of horizontal sweep will result in:

   a. a thin, white line running horizontally on the picture
   b. a keystone picture
   c. a thin, white line running vertically on the screen
   d. poor width

4. What is the frequency of the horizontal sweep section of a T.V. receiver?

   a. 60 HZ
   b. 15.75 KHZ
   c. 41.25 MHZ
   d. 455 KC

5. How does a damper failure affect the raster?

   a. no effect
   b. the raster will be gone
   c. the raster will oscillate
   d. the raster will increase in power and intensity

6. Loss of the horizontal sweep signal will also result in the loss of:

   a. the yoke
   b. high voltage
   c. the cathode CRT voltage
   d. the first anode voltage

7. Which section of a T.V. set can cause poor width on the screen?

   a. horizontal oscillator
   b. sync pulse
   c. A.F.C.
   d. horizontal output section

8. The most common cause of poor linearity in a T.V. is malfunctioning:

   a. resistor
   b. capacitor
   c. tube
   d. power supply

9. Poor picture height in a T.V. is caused by either the output stage or:

   a. loss of horizontal sync pulse
   b. too high power supply voltage
   c. a weak vertical oscillator drive
   d. a low vertical sync pulse

10. What type of voltage is produced in the damper circuit of the horizontal section of a T.V. set?

    a. boosted B+
    b. high voltage
    c. B=
    d. a low power damper voltage

LAP TEST ANSWER KEY: PICTURE SWEEP FAILURE

1. B
2. A
3. C
4. B
5. B
6. B
7. D
8. B
9. C
10. A

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Loss of Vertical Sweep

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a television set, identify the picture sweep circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Vertical Sweep Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

Transistor TV Training Course by Middleton.

PROCEDURE:

1. Read Lesson 12 in the response manual.
2. Complete the Practice Exercise for Lesson 12.
3. Check answers with the answer key.
4. Read Chapter 7, "Vertical-Sweep System," in the Transistor TV Training Course.
5. Answer the review questions at the end of Chapter 7.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of Vertical Sweep Troubles

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the picture sweep section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop No. 12, Loss of Vertical Sweep.

Projector.

PROCEDURE:

1. View Film Loop No. 12 indicated in the resources and complete the activities indicated in the film loop.
2. Check answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.05.15.A2-2
77.04.05.16.A2-2

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LAP TEST: LOSS OF VERTICAL SWEEP AND SYMPTOMS OF VERTICAL SWEEP TROUBLES

77.04.05.15.

1. The extent to which a picture fills the screen vertically is defined as:

   a. vertical height
   b. vertical linearity
   c. vertical output
   d. vertical oscillator

2. The audio and raster on a T.V. are normal, but the video is missing. The video amp checked out o.k. What should be checked next?

   a. horizontal output
   b. first I.F. amp
   c. A.G.C.
   d. picture tube

3. The audio is normal, but the people in the picture have long legs and short heads. What section should be checked?

   a. vertical linearity
   b. vertical output
   c. vertical height
   d. damper

4. The output of the vertical driver stage goes to the:

   a. vertical output
   b. vertical oscillator
   c. horizontal AFC
   d. yoke

5. The circuit which produces the deflection signal is the:

   a. vertical oscillator
   b. vertical sync pulse
   c. vertical A.F.C.
   d. vertical output

77.04.05.16

6. A T.V. has normal audio and raster, but the video is shrunk at both the top and the bottom. What section is bad?

   a. sync separator
   b. vertical sweep
   c. yoke
   d. horizontal output

7. The sound is normal, but there is a thin, white line across the screen. Which section is bad?

   a. vertical sweep
   b. damper
   c. yoke
   d. horizontal sweep

8. A T.V. has a normal raster, but both the video and audio are missing. The audio has some hum. What should be checked?

   a. video amp
   b. A.G.C.
   c. audio detector
   d. R.F. amp

9. If a raster is normal with no video and no volume, but the volume control has some affect, the malfunctioning section is the:

   a. video amp
   b. tuner mixer
   c. R.F. amp
   d. tuner oscillator

10. A complete vertical sweep failure will result in:

    a. a thin, white line running horizontally on the screen
    b. a thin, white line running vertically on the screen
    c. a complete loss of the raster
    d. a loss of high voltage .

LAP TEST ANSWER KEY: LOSS OF VERTICAL SWEEP AND SYMPTOMS OF VERTICAL SWEEP TROUBLES

LAP 15

1. A
2. D
3. A
4. A
5. A

LAP 16

6. B
7. A
8. A
9. A
10. A

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Vertical Sweep Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the picture sweep section of a TV set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on the unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

TSD trainer or television set
Oscilloscope
Soldering & desoldering irons and tools
Transistor checker
Vacuum tube checker
Vacuum tube voltmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).

   NOTE: FOLLOW SAFE PRACTICES AND PROCEDURES!
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.05.17.A2-2

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LAP TEST: DIAGNOSING VERTICAL SWEEP TROUBLES

1. What type of voltage is produced in the damper circuit of the horizontal section of a T.V. set?

   a. B=
   b. boosted B+
   c. low power damper voltage
   d. high voltage

2. If a stage fails completely in the horizontal section of a T.V., what will be the overall effect?

   a. no video
   b. no raster
   c. no linearity
   d. no audio

3. A loss of horizontal sweep will result in:

   a. a thin, white line running vertically on the screen
   b. a keystone picture
   c. a thin, white line running horizontally on the screen
   d. poor width

4. A T.V. displays people with short legs and long heads. What should be adjusted?

   a. yoke
   b. vertical height
   c. damper
   d. vertical linearity

5. The output of the vertical driver stage goes to the:

   a. yoke
   b. horizontal A.F.C.
   c. vertical output
   d. vertical oscillator

6. The audio and raster are normal, but there is no video. The video circuit checked out normal, so what should be checked next?

   a. horizontal output
   b. A.G.C.
   c. picture tube
   d. first I.F. amp

7. What is the basic function of the sweep section of a T.V. receiver?

   a. to provide power for the video amp
   b. to align the different frequencies
   c. to provide feedback for oscillation
   d. to move the electron beam

8. How does a damper failure affect the raster?

   a. no affect
   b. it will disappear
   c. it will oscillate
   d. the raster will increase in power and in intensity

9. If the vertical sweep is completely lost, the picture will look like:

   a. a blank screen
   b. a thin, white vertical line
   c. a thin, white horizontal line
   d. a snowy screen

10. What will the picture look like on a T.V. if the yoke fails?

    a. it will have black hum bars
    b. keystone or trapezoidal
    c. no raster
    d. it will shrink on all four sides

LAP TEST ANSWER KEY: DIAGNOSING VERTICAL SWEEP TROUBLES

1. B
2. B
3. A
4. D
5. C
6. C
7. D
8. B
9. C
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Audio/Video/Sweep Section Troubles

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, identify the audio-video/sweep circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Audio/Video/Sweep Section Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 14 in the response manual.
2. Complete the Practice Exercises for Lesson 14.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Symtoms of Audio-Video/Sweep Section Troubles

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the audio/video/sweep sections of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop No. 14, Symptom Set II.

Projector.

PROCEDURE:

1. View Film Loop No. 14 indicated in the resources and complete the activities indicated in the film loop
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ **File Code:** 77.04.05.18.A2-2
77.04.05.19.A2-2

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LAP TEST: AUDIO/VIDEO/SWEEP SECTION TROUBLES AND SYMPTOMS OF AUDIO/VIDEO/SWEEP SECTION TROUBLES

77.04.05.18

1. A T.V. set has lost vertical sync, but a normal hammerhead pattern is seen. What section should be checked?

    a. sync separator
    b. vertical output
    c. vertical sync amp
    d. A.G.C.

2. A T.V. has lost its vertical sync and the hammerhead pattern is missing. The video I.F. has been checked and found to be o.k. What should be checked next?

    a. television station
    b. video amp
    c. R.F. amp
    d. vertical sweep

3. The sound and raster are normal, but there is no video. There is some change when the contrast control is varied. What section is malfunctioning?

    a. video output
    b. third I.F. amp
    c. video detector
    d. video amp

77.04.05.19

4. There is a loss of horizontal sync and the sync will not lock in. The oscillator, A.F.C. and sync separator checked o.k. What section should be checked next?

    a. output
    b. vertical sync pulse
    c. phase inverter
    d. damper

5. There is some slight snow in the video with a normal raster and weak audio. What section could be bad?

    a. video detector
    b. A.G.C.
    c. R.F. amp
    d. I.F. amp

6. The raster is normal, but there is no audio or video. There is some atmospheric sound. What section should be checked?

   a. first I.F. amp
   b. video detector
   c. A.G.C.
   d. local oscillator in tuner

7. The audio is normal, but the video and raster are dim. What section is bad?

   a. video amp
   b. horizontal sweep
   c. video output
   d. CRT

8. The video and raster are normal, but the sound is dead. The background noise varies with the volume control. What section should be checked?

   a. audio output
   b. sound detector
   c. video amp
   d. sound trap

9. The sound and raster are normal, but the video is missing. There is no change when varying the contrast control. What section should the technician troubleshoot?

   a. video detector
   b. video output
   c. A.G.C.
   d. video amp

10. The horizontal section will not sync, and the oscillator will not pass through the sync. What should be checked?

   a. sync separator
   b. horizontal oscillator
   c. yoke
   d. damper

LAP TEST ANSWER KEY: AUDIO/VIDEO/SWEEP SECTION TROUBLES AND SYMPTOMS OF AUDIO/VIDEO/SWEEP SECTION TROUBLES

LAP 18

1. C
2. A
3. D

LAP 19

4. C
5. D
6. D
7. D
8. B
9. B
10. B

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Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Diagnosing Sweep Section Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the sweep section of a TV set.

EVALUATION PROCEDURE:

Diagnose and repair skills are evaluated on the unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Audio/Video/Sweep Section Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.
Instruction Manual for 1077 Television Analyst, B & K Division of Dynascan Corp.

TSD Trainer or television set
Television Analyst, B & K Model 1077B
Oscilloscope
Soldering & desoldering iron and tools
Transistor checker
Vacuum tube checker
Vacuum tube voltmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.

2. Read "Horizontal Grid Drive Signal and Horizontal Solid State Sweep Drive," on Page 39 and "Horizontal Plate Drive Signal and Boost Indicator," on Page 42 in Instruction Manual for Model 1077 Television Analyst.

3. Diagnose the receiver using the television analyst.

4. After diagnosis is completed, fill in all requested data on a diagnosis sheet.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

PROCEDURE: (continued)

5. Locate the malfunction(s) and have the instructor verify it.
6. After verification, correct the malfunction(s).
7. Proceed to the next LAP.

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File Code: 77.04.05.21.A2-0

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Audio/Video/Sweep Section Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the audio/video/sweep section of a TV set.

EVALUATION PROCEDURE:

Diagnose and repair skills are evaluated on the unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheets.
Photofact Service, Sams.

TSD Trainer or real television set
Oscilloscope
Soldering & desoldering irons and tools
Transistor checker
Vacuum tube checker
Vacuum tube voltmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver equipment for possible malfunction(s).
3. After diagnosis is complete, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have it verified by the instructor.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.05.20.A2-2
77.04.05.21.A2-2

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LAP TEST: DIAGNOSING SWEEP SECTION TROUBLES AND AUDIO/VIDEO/SWEEP SECTION TROUBLES

77.04.05.20

1. What will the raster look like on a T.V. if the yoke fails?

   a. no raster
   b. it will have black hum bars
   c. it will shrink on all four sides
   d. keystone or trapezoidal

2. To prevent undesirable oscillation from interfering with the picture after retrace, what section is added to the circuit?

   a. feedback
   b. flyback
   c. boost
   d. damper

3. The output of the vertical driver stage goes to the:

   a. vertical output
   b. vertical oscillator
   c. horizontal A.F.C.
   d. yoke

4. If the horizontal oscillator ceases to function, what will happen to the picture?

   a. it will disappear
   b. it will shrink
   c. nothing
   d. it will be keystone in shape

5. How does a damper failure affect the raster?

   a. no effect
   b. the raster will increase in brightness
   c. it will disappear
   d. it will oscillate

77.04.05.21

6. The most common cause of poor linearity in a T.V. is a malfunctioning:

   a. resistor
   b. capacitor
   c. tube
   d. power supply

7. The audio and raster on a T.V. are normal, but the video is missing. The video amp checks o.k. What should be checked next?

   a. first I.F. amp
   b. picture tube
   c. horizontal output
   d. A.C.C.

8. If the horizontal oscillator is severely off frequency and the oscillator checks out o.k., what other section should be checked?

   a. sync separator
   b. A.F.C.
   c. vertical sync amp
   d. horizontal differentiator

9. The audio is normal but both the raster and video are missing. What is a likely cause of this problem?

   a. bad video output
   b. bad sunc repentor
   c. bad CRT
   d. bad video amp

10. The raster is normal, but the video is missing. The audio is weak but, the volume control has some effect. Where might the problem be?

   a. sync repentor
   b. video amp
   c. A.A.C.
   d. third I.F. amp

LAP TEST ANSWER KEY: DIAGNOSING SWEEP SECTION TROUBLES AND AUDIO/VIDEO/SWEEP SECTION TROUBLES

LAP 20

1. D
2. D
3. A
4. A
5. C

LAP 21

6. B
7. B
8. B
9. C
10. B

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UNIT POST TEST: TELEVISION SWEEP SECTION TROUBLES

77.04.05.01.

1. When a technician is able to vary the picture with the horizontal hold control, this tells him that:

   A. a vertical sweep problem exists.
   B. a sweep problem exists.
   C. there is not a sweep problem.
   D. a vertical sync problem exists.

2. What piece of test equipment should be used to check the sync-separator?

   A. an ammeter
   B. an oscilloscope
   C. a signal generator
   D. a V.O.M.

3. If the picture rolls from left to right across the screen, what section might be causing the trouble?

   A. sync separator
   B. horizontal sync
   C. vertical sync amp
   D. vertical sync

4. What is transmitted from a station to lock the picture both vertically and horizontally?

   A. video
   B. vertical sync
   C. horizontal sync
   D. sync pulse

5. If a T.V. set has its picture move from top to bottom and cannot be stopped, what might be the trouble?

   A. damage to the horizontal sync
   B. bad sync separator
   C. malfunctioning sync amp
   D. vertical sync failure

77.04.05.02.

6. The control used to adjust the vertical stability is the:

   A. vertical height control.
   B. horizontal hold control.
   C. A.G.C. control.
   D. vertical hold control.

7. The control used to adjust the horizontal stability is the:

   A. A.G.C. delay.
   B. vertical hold control.
   C. horizontal hold control.
   D. horizontal width control.

8. Which stage of a T.V. is responsible for sorting out sync pulses?

   A. sync separator
   B. sync amplifier
   C. horizontal A.F.C.
   D. I.F. amp

9. The sync separator gets its pulse from the:

   A. A.G.C. pulse.
   B. video amp.
   C. third I.F. amp.
   D. first I.F. amp.

10. A T.V. has some hum, but no audio or video. The raster and video circuitry check o.k.. What section should be troubleshot next?

   A. third I.F. amp
   B. second I.F. amp
   C. first I.F. amp
   D. A.G.C. control

77.04.05.03.

11. Both the sound and the raster are normal, but the video is floating in the picture. Where should the technician begin to troubleshoot?

   A. video amp
   B. sync separator
   C. A.G.C.
   D. vertical sweep

12. The raster and sound are normal, but the picture rolls up and down. What section should be checked first?

    A. horizontal A.F.C.
    B. sync separator
    C. horizontal sync amp
    D. vertical sync amp

13. The raster is normal, but the video is gone. The audio is very weak, but the volume control has some effect. Where might the problem be?

    A. video amp
    B. sync separator
    C. A.G.C.
    D. third I.F. amp

14. If the sync separator fails, what affect will this have on the audio?

    A. The audio will disappear.
    B. distortion
    C. The audio will increase in volume.
    D. none

15. If the sync separator fails, the picture will:

    A. roll horizontally.
    B. lose A.G.C. control.
    C. roll vertically and horizontally.
    D. roll vertically.

77.04.05.04.

16. The section of the sync separator that removes the vertical sync is the:

    A. vertical integrator.
    B. horizontal differentiator.
    C. horizontal phase invertor.
    D. vertical sync amp.

17. The audio is normal, but both the raster and video are missing. What might cause this problem?

    A. bad video amp
    B. bad picture tube
    C. bad sync separator
    D. bad video output

18. What causes the picture to roll left to right across the screen?

    A. vertical sync
    B. sync separator
    C. horizontal sync
    D. vertical sync amp

19. What piece of test equipment should be used to check the sync-separator?

A. a VOM
B. a VTVM
C. a scope
D. a signal generator

20. The control used to adjust the horizontal stability is the:

A. A.G.C. delay.
B. horizontal width control.
C. horizontal hold control.
D. vertical hold control.

77.04.05.05.

21. Why is it not possible to view the vertical blanking bar on some T.V. sets?

A. It can only be viewed on black and white sets.
B. The T.V. station does not broadcast it all the time.
C. The contrast control cannot make it light enough.
D. It can only be seen on color sets.

22. Does the sync separator have any effect on the audio?

A. no
B. occasionally
C. yes
D. possibly

23. How much peak-to-peak voltage is found in the average sync section of a T.V.?

A. 10 v
B. .1 v
C. .6 v
D. 8 v

24. What is the frequency of the signal pulse coming from the sync separator going to the sync amp in the sync section of a T.V.?

A. 15,750 HZ
B. 41.75 HZ
C. 455 HZ
D. 60 HZ

25. Where does the sync separator get its pulse from?

A. the third I.F. amp
B. the horizontal A.F.C.
C. the A.G.C.
D. the video amp

77.04.05.06.

26. What pulse is carried in the video information carrier?

A. sync pulse
B. vertical A.F.C. pulse
C. audio pulse
D. A.G.C. pulse

27. What circuit keeps the horizontal on frequency?

A. horizontal output
B. sync separator
C. horizontal A.F.C.
D. horizontal driver

28. What stage of the sync section is found in most solid-state T.V. sets?

A. transformed coupling circuit
B. vertical-sync amp
C. vertical-sync stop
D. vertical output driver

29. What is defined as the processes and signals which cause the picture to be scanned vertically?

A. vertical hold control
B. vertical sync
C. vertical sweep
D. vertical flyback or retrace

30. If the raster is normal, but the video displays excess snow and the audio is quite noisy, what section can be at fault?

A. R.F. amp
B. mixer
C. oscillator
D. A.G.C

77.04.05.07.

31. The raster is normal, but the video is missing and there is some noise in the sound. What might be the malfunctioning section?

A. local oscillator
B. mixer
C. R.F. amp
D. first I.F. amp

32. A T.V. set has normal raster and video, but no audio and no hum. What section might be at fault?

A. audio detector
B. video output
C. audio amp
D. volume control

33. What can be used as a valuable indication that the vertical-sync section is operating?

A. the hammerhead pattern
B. VOM
C. oscilloscope
D. sync-generator

34. A T.V. set has both normal sound and raster, but the video is floating. Where does the problem exist?

A. vertical sync amp
B. sync amp
C. sync separator
D. horizontal A.F.C.

35. The sound and raster are normal, but the picture is rolling. What might be the problem?

A. sync separator
B. vertical sync amp
C. horizontal A.F.C.
D. local oscillator

77.04.05.08.

36. The raster is normal, but there is a buzz in the sound and an excessive amount of contrast. Where is the problem?

A. A.G.C.
B. R.F. amp
C. third I.F. amp
D. first I.F. amp

37. What is another term for the vertical integrator circuit in the sync section of a T.V. set?

A. a low frequency amp
B. a high-pass filter
C. a band-pass filter
D. a low-pass filter

38. When troubleshooting, what should be checked after the voltage in the sync separator has been checked?

A. waveform
B. resistance
C. inductance
D. capacitance

39. What can be used as a valuable indication that the vertical-sync section is operating?

A. the hammerhead pattern
B. sync-generator
C. oscilloscope
D. VOM

77.04.05.09.

40. What is another term for the horizontal differentiator in the sync system?

A. low-pass filter
B. high-pass filter
C. a band-stop filter
D. a band-pass filter

77.04.05.10.

41. What component do most T.V. manufacturers use for A.F.C. control in T.V. sets?

A. RL networks
B. a capacitor PI network
C. diodes
D. RC networks

42. What generates the sweep signal in the horizontal section of a T.V. set?

A. oscillator
B. damper
C. A.F.C. circuit
D. output

77.04.05.11.

43. If the horizontal oscillator is too far off frequency, what will be the end result?

A. loss of raster
B. loss of sync separator
C. loss of horizontal sync
D. loss of video

44. What circuit keeps the horizontal oscillator on frequency in a T.V. set?

A. sync circuit
B. output circuit
C. A.F.C. circuit
D. damper circuit

45. If the horizontal oscillator is severely off frequency and the oscillator checks out okay, what other section should be checked first?

A. vertical sync amp
B. horizontal differentiator
C. sync-separator
D. A.F.C.

77.04.05.12.

46. If the horizontal oscillator is severely off frequency and the oscillator checks out okay, what other section should be checked first?

A. sync-separator
B. A.F.C.
C. horizontal differentiator
D. vertical sync amp

47. What is the frequency of the vertical sweep?

A. 15,750 Hz
B. 60 Hz
C. 41.25 MHz
D. 455kc

48. The sound and raster are normal, but the picture is full of lines. What section should be checked?

A. vertical retrace lines
B. vertical oscillator
C. horizontal oscillator
D. yoke assembly

49. Poor picture height in a T.V. is caused by either the output stage or:

A. too high a power supply voltage.
B. a low vertical-sync pulse.
C. a weak vertical oscillator drive.
D. loss of horizontal sync pulse.

50. The most common cause of poor linearity in a T.V. is a bad:

A. tube.
B. resistor.
C. capacitor.
D. power supply.

77.04.05.13.

51. Loss of the horizontal sweep signal will also result in the loss of:

A. the yoke.
B. high voltage.
C. the cathode CRT voltage.
D. the first anode voltage.

52. What is another term used for horizontal linearity coil?

A. yoke static discharge
B. an efficiency coil
C. B+ adjuster
D. a linearity pot

53. Poor picture height in a T.V. is caused by either the output stage or:

A. loss of horizontal-sync pulse.
B. a low vertical-sync pulse.
C. a weak vertical oscillator drive.
D. too high power supply voltage.

54. Why is the frequency of both the horizontal output transformer and the yoke so high?

A. To build up enough high voltage.
B. To keep each other in sync.
C. To match the frequency being transmitted.
D. Because of the high retrace time needed.

55. The vertical linearity control primarily affects what area of the screen?

A. bottom
B. right side
C. left side
D. top

77.04.05.14.

56. The circuit which produces the deflection signal is the:

A. vertical A.F.C..
B. vertical oscillator.
C. vertical output.
D. vertical-sync pulse.

57. The audio and raster on a T.V. are normal, but the video is missing, and the video amp checked out o.k.. What should be checked out next?

A. picture tube
B. horizontal output
C. first I.F. amp
D. A.G.C.

58. The extent to which a picture fills the screen vertically is defined as:

    A. vertical oscillator.
    B. vertical linearity.
    C. vertical output.
    D. vertical height.

59. A T.V. is displaying people with short legs and long heads. What should be adjusted?

    A. yoke
    B. vertical height
    C. vertical linearity
    D. damper

60. The output of the vertical driver stage goes to the:

    A. vertical oscillator.
    B. vertical output.
    C. yoke.
    D. horizontal A.F.C..

77.04.05.15.

61. The sound is normal, but there is a thin, white line across the screen. Which section is bad?

    A. yoke
    B. horizontal sweep
    C. vertical sweep
    D. damper

62. The audio and raster are normal, but the video is floating in the picture. What is the malfunctioning section?

    A. vertical separator
    B. R.F. amp
    C. sync-separator
    D. A.G.C.

63. A T.V. has no raster, but good audio. After discovering the CRT to be all right, what should be checked next?

    A. vertical sweep
    B. yoke
    C. power supply
    D. vertical separator

64. A T.V. has a normal raster, but both the video and audio are missing. The audio has some hum. What should be checked?

A. A.G.C.
B. audio detector
C. R.F. amp
D. video amp

65. The audio and raster are normal, but the video is floating in the picture. What is the malfunctioning section?

A. vertical separator
B. sync-separator
C. A.G.C.
D. R.F. amp

77.04.05.16.

66. What type of voltage is produced in the damper circuit of the horizontal section of a T.V. set?

A. boosted B+
B. high voltage
C. low power damper voltage
D. B—

67. The output of the vertical driver stage goes to the:

A. yoke.
B. vertical oscillator.
C. horizontal A.F.C..
D. vertical output.

68. The audio and raster are normal, but there is no video. The video circuit checked out normal, so what should be checked next?

A. A.G.C.
B. picture tube
C. horizontal output
D. first I.F. amp

69. What is the basic function of the sweep section of a T.V. receiver?

A. to move the electron beam
B. to provide feedback for oscillation
C. to align the different frequencies
D. to provide power for the video amp

70. A loss of horizontal sweep will result in:

A. a keystone picture.
B. poor width.
C. a thin, white line running horizontally on the screen.
D. a thin, white line running vertically on the screen.

77.04.05.17.

71. A T.V. set has lost vertical sync, but a normal hammerhead pattern is seen. What section should be checked?

A. vertical sync amp
B. A.G.C.
C. vertical output
D. sync separator

72. A T.V. has lost its vertical sync and the hammerhead pattern is missing. The video I.F. has been checked and found to be o.k.. What should be checked next?

A. R.F. amp
B. vertical sweep
C. video amp
D. A.G.C.

73. A T.V. has a normal raster and video, but no sound. There is no background or hum. What section of the audio should be checked?

A. I.F.
B. trap
C. detector
D. output

74. The sound and raster are normal, but there is no video. There is some change when the contrast control is varied. What section is not functioning?

A. video amp
B. video output
C. third I.F. amp
D. video detector

75. The raster is normal with weak sound and video. There is also a lot of snow in the picture. What section should the repairman troubleshoot?

A. R.F. amp
B. local oscillator
C. third I.F. amp
D. A.G.C.

77.04.05.18.

76. The audio is normal, but the video and raster are dim. What section is bad?

A. CRT
B. horizontal sweep
C. video amp
D. video output

77. The sound and raster are normal, but the video is missing. There is no change when varying the contrast control. What section should the technician troubleshoot?

A. A.G.C.
B. video amp
C. video output
D. video detector

78. There is a loss of horizontal sync and the sync will not lock in. The oscillator, A.F.C., and sync separator checked o.k.. What section should be checked next?

A. vertical sync pulse
B. damper
C. output
D. phase inverter

79. The horizontal section will not sync, and the oscillator will not pass through sync. What should be checked?

A. horizontal oscillator
B. damper
C. sync separator
D. yoke

80. The video and raster are normal, but the sound is dead. The background noise varies with the volume control. What section should be checked?

A. sound detector
B. audio output
C. video amp
D. sound trap

77.04.05.19.

81. How does a damper failure affect the raster?

A. The raster will increase in brightness.
B. no effect
C. It will disappear.
D. It will oscillate.

82. If the horizontal oscillator ceases to function, what will happen to the picture?

A. nothing
B. It will shrink.
C. It will be keystone in shape.
D. It will disappear.

83. The output of the vertical driver stage goes to the:

A. horizontal A.F.C..
B. vertical output.
C. yoke.
D. vertical oscillator.

84. To prevent undesirable oscillation from interferring with the picture after-trace, what section is added to the circuit?

A. boost
B. feedback
C. damper
D. flyback

85. A loss of horizontal sweep will result in:

A. a thin, white line running vertically on the screen.
B. a keystone picture.
C. poor width.
D. a thin, white line running horizontally on the screen.

77.04.05.20.

86. The audio is normal but both the raster and video are missing. Why?

A. bad video output
B. bad video amp
C. bad CRT
D. bad sync repentor

87. The raster is normal, but the video is missing. The audio is weak but the volume control has some effect. Where might the problem be?

A. video amp
B. third I.F. amp
C. sync-repentor
D. A.A.C.

88. If the horizontal oscillator is severely off of frequency and the oscillator checks out o.k., what other section should be checked?

A. sync-repentoe
B. horizontal differentiator
C. A.F.C.
D. vertical UPU amp

89. The audio and raster on a T.V. are normal, but the video is missing. The video amp checks o.k.. What should be checked next?

A. picture tube
B. A.C.C.
C. horizontal output
D. first I.F. amp

90. The most common cause of poor linearity in a T.V. is a malfunctioning:

A. resistor
B. capacitor
C. power supply
D. tube

UNIT POST TEST ANSWER KEY: TELEVISION SWEEP SECTION TROUBLES

LAP 01	1.	C
	2.	B
	3.	B
	4.	D
	5.	D
LAP 02	6.	D
	7.	C
	8.	A
	9.	B
	10.	A
LAP 03	11.	B
	12.	D
	13.	A
	14.	D
	15.	C
LAP 04	16.	A
	17.	B
	18.	C
	19.	C
	20.	C
LAP 05	21.	C
	22.	A
	23.	D
	24.	A
	25.	D
LAP 06	26	A
	27.	C
	28.	B
	29.	C
	30.	A
LAP 07	31.	A
	32.	C
	33.	A
	[illegible].	[illegible]
	[illegible].	[illegible]
LAP 08	36.	A
	37.	D
	38.	A
	39.	A
LAP 09	40.	B
LAP 10	41.	C
	42.	A
LAP 11	43.	A
	44.	C
	45.	D
LAP 12	46.	B
	47.	B
	48.	C
	49.	C
	50.	C
LAP 13	51.	B
	52.	B
	53.	C
	54.	D
	55.	D
LAP 14	56.	B
	57.	A
	58.	D
	59.	C
	60.	B
LAP 15	61.	C
	62.	C
	63.	A
	64.	D
	65.	B
LAP 16	66.	A
	67.	D
	68.	B
	69.	A
	70.	D
LAP 17	71.	A
	72.	D
	73.	D
	74.	A
	75.	A
LAP 18	76.	A
	77.	C
	78.	D
	79.	A
	80.	A

UNIT POST TEST ANSWER KEY: TELEVISION SWEEP SECTION TROUBLES

LAP 19
81. C
82. D
83. B
84. C
85. A

LAP 20
86. C
87. A
88. C
89. A
90. B

Student: ______________ File Code: 77.04.05.00.A1-5

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Family Pay Number: ________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: TELEVISION SWEEP SECTION TROUBLES

OBJECTIVE 1:

The student will diagnose malfunctions with regard to sweep section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunction in the sweep section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the sweep section.

The term "sweep section" refers to the following:

1. sync section
2. vertical sync section
3. horizontal sync section
4. horizontal sweep section
5. vertical sweep section

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. no vertical sync
2. no horizontal sync
3. no raster

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defect he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron B & K television analyst, oscilloscope, tube checker, volt-ohmmeter, hand tools, cathode ray tube checker, desoldering tools and replacement components.

Student: ______________________ **File Code:** 77.04.05.00.A1-5

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Family Pay Number: ____________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose sweep failures.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to sweep section		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to sweep sections.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to sweep failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to sweep failure.		

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

[illegible] criterion on all line items to obtain an overall score of satisfactory

1.

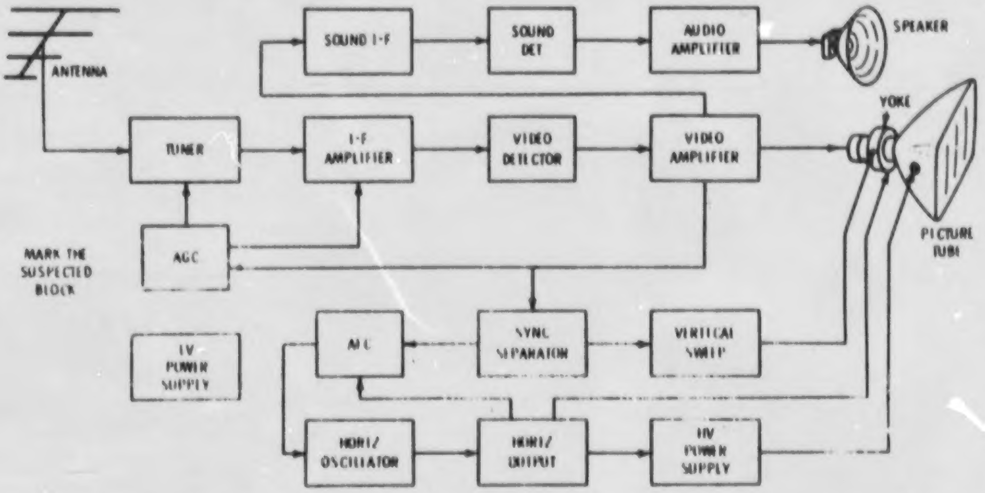
BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2.

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**
DIAGNOSIS (suspected block) and comments:		

3.



ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
AGC
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

MARK THE SUSPECTED BLOCK

CORRECTIVE ACTION (suggested or taken):

When your diagnosis is complete, continue with the remainder of the lesson.

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

check for audio
check for video
check for raster
check for snow
checks for sync

OBJECTIVE 2: Troubleshooting

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

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Mountain-Plains Education &
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Learning Experience Guide

UNIT: TELEVISION HIGH-VOLTAGE AND POWER SUPPLY TROUBLES

RATIONALE:

All television receivers have low and high-voltage power supplies. Therefore, the service person must be effective in diagnosing, troubleshooting and localizing malfunctions in these power supplies. Recognizing abnormal operations and isolating the power supply problem is an important skill to develop for repairing television receivers. In this unit, low and high-voltage power supply diagnosis and repair are the objectives.

PREREQUISITES:

Unit 77.04.05. Television Sweep Section Troubles

OBJECTIVE:

Students will recognize symptoms of trouble, diagnose difficulties, and correct malfunctions for low and high-voltage power supply sections of the television receiver using appropriate tools and equipment.

RESOURCES:

Printed Materials

Black & White Television Diagnosis Sheets.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Transistor TV Training Course. Robert G. Middleton, Howard W. Sams and Company, Inc., 1973.
Photofact Television Course. Howard W. Sams Editorial Staff, Howard W. Sams and Company, Inc., 1975.

Audio/Visuals

Super 8 Sound Film:

Television Symptom Diagnosis Series TSD-133. (Film Loop Nos. 15, 16, 17 & 18). Hickok Teaching Systems, Inc. Woburn, Massachusetts.

Principal Author(s): L. Leland, B. Vetter

RESOURCES: (continued)

Equipment

Cathode ray tube checker
Capacitor checker
Color T.V.
Desoldering iron
Desoldering tools
Soldering iron
Service Master 99SM Kit, or equivalent; Xcelite 99SM Kit; Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona
Oscilloscope
High voltage probe (30 kv)
Super 8 Sound Film Projector, Model 60, Hickok Teaching Systems, Inc.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 West Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, Kt-185Y, Hickok Teaching Systems, Inc.
Soldering tools
Transistor F.E.T. checker
Volt-ohm meter

GENERAL INSTRUCTIONS:

This unit consists of 16 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) In this unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit test as described in the unit LEG "Evaluation Procedures."
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Loss of Raster
.02 High-Voltage Failure
.03 Symptoms of High-Voltage Failure
.04 Diagnosing High-Voltage Failure
.05 Low-Voltage Power Supply Troubles
.06 Low-Voltage Failure
.07 Symptoms of Low-Voltage Failure
.08 Diagnosing Low-Voltage Failure
.09 Television Set Adjustments
.10 Television Control Troubles
.11 Diagnosing Television Control Troubles
.12 Audio/Video/Sweep/Power Supply Circuit Troubles
.13 Symptoms of Audio/Video/Sweep/Power Supply Circuit Troubles
.14 Diagnosing Audio/Power Supply Troubles
.15 Diagnosing Video/Power Supply Troubles
.16 Diagnosing Sweep/Power Supply Troubles

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After reading this unit guide, go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

As you perform the activity, you are expected to use the knowledge and skill that was gained in prerequisites for this unit.

Student: ______________________ File Code: 77.04.06.00.A2-2

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UNIT PRETEST: TELEVISION HIGH-VOLTAGE AND POWER SUPPLY TROUBLES

77.04.06.01.

1. What type of voltmeter probe should be used when checking voltage in the high voltage section?

   A. demodulator probe
   B. capacitive input probe
   C. high voltage probe
   D. high reactance probe

2. Which stage drives the high voltage power supply circuit?

   A. low voltage power supply
   B. A.G.C.
   C. vertical output
   D. horizontal output

3. Which of the following is not a method of high-voltage regulation in a color set?

   A. horizontal bias oscillator
   B. horizontal bias regulator
   C. shunt regulator
   D. horizontal regulator

4. Which of the following will not affect the total loss of high voltage?

   A. flyback transformer
   B. horizontal output
   C. vertical output
   D. shunt regulator

5. Why must components be kept in their proper place when working with the high voltage cage?

   A. for peak performance
   B. fire hazard
   C. for good regulation
   D. for better coupling

77.04.06.02.

6. What is the frequency of the flyback transformer in a color T.V.?

   A. 6000 HZ
   B. 60 HZ
   C. 16,000 HZ
   D. 15,750 HZ

7. The pulse voltage in the horizontal regulator circuit comes from the:

   A. A.G.C.
   B. flyback transformer
   C. video amp.
   D. sync amp.

77.04.06.03.

8. What is the function of the damper section in a high voltage system?

   A. produce a dampened waveform
   B. produce boosted B+
   C. produce focus voltage
   D. produce the yoke wave pulse

9. Where can the current of the horizontal output tube be monitored?

   A. in the plate
   B. in the grid
   C. in the cathode
   D. in the flyback transformer

10. What will cause the high voltage to become too high?

   A. flyback
   B. output
   C. regulator
   D. damper

77.04.06.04.

11. Will high voltage be developed if the high voltage lead is not connected to the picture tube?

   A. only if it is in a color set
   B. no
   C. only if it is grounded
   D. yes

12. Can high voltage waveforms be viewed with a scope?

   A. no
   B. yes
   C. only with a high voltage probe
   D. only in a black and white set

13. What is the best method of checking components in the high voltage section?

    A. examination
    B. ohmeter
    C. voltmeter
    D. high voltage probe

14. What section in the horizontal sweep will cause a raster failure?

    A. damper only
    B. output only
    C. all of them
    D. oscillator

15. Which of the following is a high voltage problem?

    A. no sync
    B. no sound
    C. no raster
    D. no video

77.04.06.05.

16. What causes hum in the audio and raster of a T.V. set?

    A. bad filter capacitors
    B. bad transformer
    C. open bleeder resistors
    D. openfilter chokes

17. What type of filter is most often used in T.V. sets?

    A. M filter
    B. PI network
    C. LC network
    D. RC network

18. Which type of power supply produces the highest voltage?

    A. half-wave voltage doubler
    B. center tapped half wave
    C. full wave
    D. bridge rectifier

19. What is a disadvantage of a bridge-type rectifier circuit?

    A. expensive to build
    B. [illegible] voltage output
    C. requires a center-tapped transformer
    D. requires a good amount of filtering

20. What is a disadvantage of a half-wave rectifier power supply?

A. expensive to build
B. low power output
C. needs a transformer
D. needs heavy filtering

77.04.06.06.

21. What type of T.V. power supply is the most efficient?

A. bridge
B. full-wave
C. half-wave
D. voltage doubler

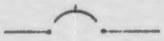
22. What device is used for regulation in a transistor type power supply?

A. tube
B. transformer
C. zener diode
D. germanium diode

23. How can a circuit breaker be checked for workability while the power is off?

A. ammeter
B. ohmmeter
C. substitution
D. B & K analyst

24. What does the following symbol represent?



A. fusable resistor
B. fuse
C. circuit breaker
D. temporary jumper

25. What is another name for a power supply?

A. AC-DC converter
B. step-up supply
C. step-down supply
D. voltage divider

77.04.06.07.

26. What [illegible] the raster look like on a set with a low voltage problem?

A. shrunken picture
B. trapezoidal picture
C. hum bars
D. distorted sound

27. What is the normal troubleshooting procedure for a power supply?

    A. low voltage probe
    B. substitution
    C. ammeter
    D. voltage measurement

28. What else can cause hum in the video besides the power supply?

    A. CRT
    B. cathode to heater short in a tube
    C. misaligned I.F.
    D. shorted video output

77.04.06.08.

29. What causes low voltage in a power supply?

    A. shorted component
    B. bad transformer
    C. open resistor
    D. leaky capacitors

30. What will a hum bar do to the raster of a T.V. set?

    A. bend it
    B. shrink it
    C. make it trapezoidal in shape
    D. nothing

77.04.06.09.

31. In which section is the contrast control located?

    A. video detector
    B. video amp
    C. I.F. amp
    D. CRT

32. Does the yoke have any relationship to the video of a T.V. set?

    A. yes, in all sets
    B. no
    C. in color sets only
    D. in black and white sets only

77.04.06.10

33. A good method to isolate trouble to the I.F section is to:

A. replace the second I.F. amp.
B. replace the video detector.
C. replace the first I.F. amp.
D. vary the contrast control.

34. Which section of a T.V. set's I.F. strip is the most difficult to troubleshoot?

A. detector
B. first I.F.
C. third I.F.
D. second I.F.

35. What piece of test equipment should be used to check the I.F. section of a T.V. set?

A. ohmmeter
B. voltmeter
C. scope
D. B & K analyst

77.04.06.11.

36. If a T.V. set has an A.G.C. problem, what should be checked first?

A. tubes
B. power supply
C. A.G.C. control setting
D. antenna

37. What section should be checked if a T.V. set displays a fuzzy picture or a loss of detail?

A. video
B. I.F. amp
C. video detector
D. sound take-off

38. The audio is very weak but the volume control has some effect. Both the video and raster are normal. What is the suspected trouble?

A. bad audio output
B. bad video output
C. bad sound I.F.
D. bad third I.F. amp

39. What might be the cause of this problem: normal sound, but no video or raster?

   A. bad A.G.C.
   B. bad video amp
   C. bad video output
   D. bad CRT

40. The raster is normal, but a buzz exists in the audio and the video is both bent and contrasty. What section might be the problem?

   A. A.G.C.
   B. tuner
   C. video amp
   D. I.F. amp

77.04.06.12.

41. The sound and raster are normal, but there is no video. No change occurs when the contrast is varied. What section should be checked?

   A. video detector
   B. video amp
   C. picture tube
   D. video output

42. Loss of vertical sync with a hammerhead pattern usually indicates a malfunctioning:

   A. vertical sync amp
   B. video amp
   C. A.G.C.
   D. sync separator

43. If the raster is normal, but the audio has some atmospheric sound, and the video is gone, what section should be checked?

   A. R.F. amp
   B. the mixer in the tuner
   C. the oscillator in the tuner
   D. third I.F. amp

77.04.06.13.

44. The sound is normal, but there is not enough brightness. What might cause this problem?

   A. [illegible]
   B. video amp
   C. CRT
   D. power supply

45. What will cause the raster to be normal and both the video and audio to be gone?

A. bad video detector
B. third I.F. amp
C. A.G.C.
D. power supply

77.04.06.14.

46. The raster is normal, but the audio and video are weak. There is also some slight snow. What might be the cause?

A. video detector
B. R.F. amp
C. I.F. amp
D. A.G.C.

77.04.06.15.

47. Severe snow is caused by a bad:

A. mixer.
B. R.F. amp.
C. oscillator.
D. first I.F. amp.

77.04.06.16.

48. What causes loss of horizontal sync in a T.V. set?

A. sync separator
B. A.C.C.
C. A.F.C.
D. A.G.C.

49. What will cause loss of raster in a T.V. with normal audio?

A. yoke
B. horizontal A.F.C.
C. horizontal sweep
D. vertical output

50. What section causes a picture to "bloom"?

A. high voltage power supply
B. low voltage power supply
C. video amp
D. weak picture tube

UNIT PRETEST ANSWER KEY: TELEVISION HIGH-VOLTAGE AND POWER SUPPLY TROUBLES

LAP 01	1.	C
	2.	D
	3.	A
	4.	C
	5.	B
LAP 02	6.	D
	7.	B
LAP 03	8.	B
	9.	C
	10.	C
LAP 04	11.	D
	12.	C
	13.	A
	14.	C
	15.	C
LAP 05	16.	A
	17.	D
	18.	A
	19.	A
	20.	D
LAP 06	21.	A
	22.	C
	23.	B
	24.	C
	25.	D
LAP 07	26	A
	27.	D
	28.	B
LAP 08	29.	D
	30.	A
LAP 09	31.	B
	32.	B
LAP 10	33.	D
	34.	D
	35.	B
LAP 11	36.	C
	37.	B
	38.	C
	39.	D
	40.	A
LAP 12	41.	D
	42.	A
	43.	C
LAP 13	44.	C
	45.	A
LAP 14	46.	C
LAP 15	47.	B
LAP 16	48.	C
	49.	C
	50.	A

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Mountain-Plains Education &
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Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Loss of the Raster

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the high voltage section of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Transistor TV Training Course, Middleton.

PROCEDURE:

1. Read Chapter 12 in An Entry Into TV Servicing.
2. Answer the review questions for Chapter 12.
3. Check your answers with the answer key.
4. Read Chapter 9, "Horizontal-Output and High-Voltage Sections," in Transistor TV Training Course.
5. Answer the review questions at the end of Chapter 9.
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ **File Code:** 77.04.06.01.A2-2

Date: ____________________ **Date Published:** 11/29/77

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LAP TEST: LOSS OF THE RASTER

1. What is another term for a raster being "over deflected"?

   A. over scan
   B. blooming
   C. low focus
   D. low-high voltage

2. Why must components be kept in their proper place when working with the high voltage cage?

   A. for better coupling
   B. for peak performance
   C. for good regulation
   D. fire hazard

3. The high voltage rectifier tube obtains its filament voltage from the:

   A. flyback transformer
   B. low voltage power supply
   C. voltage divider circuit
   D. power transformer

4. How much high voltage is usually found on a color T.V. CRT?

   A. 15,750 V
   B. 950 V
   C. 16,000 V
   D. 26,000 V

5. Which of the following will not affect the total loss of high voltage?

   A. vertical output
   B. horizontal output
   C. shunt regulator
   D. flyback transformer

6. Any problem that prevents the raster from being its correct size and shape can be considered a:

   A. video problem
   B. high voltage problem
   C. raster problem
   D. low voltage power and supply problem

7. The focus rectifier obtains its filament voltage from the:

   A. power transformer.
   B. filament transformer.
   C. low voltage power supply.
   D. flyback transformer.

8. What is the most common cause of low-high voltage in a T.V. set?

   A. weak horizontal output
   B. bad rectifier
   C. bad yoke
   D. weak CRT

9. What type of high voltage regulation is found in a black and white set?

   A. horizontal regulation
   B. horizontal bias regulation
   C. shunt regulation
   D. none

10. What type of voltmeter probe should be used when checking voltage in the high voltage section?

    A. demodulator probe
    B. capacitive input probe
    C. high voltage probe
    D. high reactance probe

LAP TEST ANSWER KEY: LOSS OF THE RASTER

1. B
2. D
3. A
4. D
5. A
6. C
7. D
8. B
9. D
10. C

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Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: High-Voltage Failure

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, identify the high voltage circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing High-Voltage Failure" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

Photofact Television Course, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 8, "Deflection Systems," in Photofact Television Course.
2. Answer the questions at the end of Chapter 8.
3. Check your answers with the answer key.
4. Read Lesson 15 in the response manual.
5. Complete the Practice Exercises for Lesson 15.
6. Check answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of High-Voltage Failure

OBJECTIVE:

Observe symptoms commonly related to malfunctions in the high voltage section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing High-Voltage Failure" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Film Loop 15, High-Voltage Failure.

Projector.

PROCEDURE:

1. View Film Loop 15 indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Go to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing High-Voltage Failure

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the high-voltage section of a TV set.

EVALUATION PROCEDURE:

Diagnosis and repair skills are evaluated on the unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheets.
Photofact Service, Sams.

TSD Trainer or television set
Television Analyst, B & K Model 1077B
Hand tools
High voltage probe (30 kv)
Soldering & desoldering irons and tools
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.06.02.A2-2
77.04.06.03.A2-2
77.04.06.04.A2-2

Date: ______________________ Date Published: 11/29/77

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: HIGH VOLTAGE FAILURE/SYMPTOMS AND DIAGNOSING HIGH VOLTAGE FAILURE

77.04.06.02.

1. What is the frequency of the flyback transformer in a color T.V.?

   A. 15,750 HZ
   B. 60 HZ
   C. 6000 HZ
   D. 16,000 HZ

2. The pulse voltage in the horizontal regulator circuit comes from the:

   A. video amp
   B. A.G.C.
   C. sync amp
   D. flyback transformer

3. The output of the horizontal drive stage goes to which of the following?

   A. high voltage rectifier
   B. horizontal output
   C. flyback transformer
   D. horizontal oscillator

77.04.06.03.

4. What is the function of the damper section in a high voltage system?

   A. produced boosted B+
   B. produce focus voltage
   C. produce the yoke wave pulse
   D. produce a dampened waveform

5. What is the contrast setting on a color set when checking and/or adjusting the high voltage?

   A. use the service switch on raster position.
   B. minimum
   C. maximum
   D. medium contrast

6. Where can the currenct of the horizontal output tube be monitored?

   A. in the flyback transformer
   B. in the cathode
   C. in the grid
   D. in the plate

7. Can a bad focus rectifier affect high voltage?

   A. yes
   B. only in black and white sets
   C. no
   D. only in color sets

77.04.06.04.

8. What is the best method of checking components in the high voltage section?

   A. voltmeter
   B. examination
   C. ohmeter
   D. high voltage probe

9. Which of the following is a high voltage problem?

   A. no sound
   B. video
   C. no sync
   D. no raster

10. What section in the horizontal sweep will cause a raster failure?

   A. output only
   B. oscillator only
   C. damper only
   D. all of them

77.04.06.02.A2-2
77.04.06.03.A2-2
77.04.06.04.A2-2

LAP TEST ANSWER KEY: HIGH-VOLTAGE FAILURE/SYMPTOMS OF AND DIAGNOSING HIGH-VOLTAGE FAILURE

LAP 02	1.	A
	2.	D
	3.	B
LAP 03	4.	A
	5.	B
	6.	B
	7.	A
LAP 04	8.	B
	9.	D
	10.	D

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Date Published: 12/20/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Low-Voltage Power Supply Troubles

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the low voltage power supply of a television set.

EVALUATION PROCEDURE:

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Photofact Television Course, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 13 in An Entry Into TV Servicing.
2. Answer the review questions at the end of Chapter 13.
3. Check your answers with the answer key.
4. Read Chapter 4, "Power Supplies," in Photofact Television Course.
5. Answer the review questions at the end of Chapter 4.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ **File Code:** 77.04.06.05.A2-2

Date: ____________________ **Date Published:** 11/29/77

Mountain-Plains Education &
Economic Development
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Glasgow AFB, Montana 59231

LAP TEST: LOW VOLTAGE POWER-SUPPLY TROUBLES

1. The main function of a power supply is to provide:

   A. rectification
   B. operating voltage
   C. filament voltage
   D. filtering

2. Where is the interlock located on a T.V. set?

   A. the back cover
   B. rear of the chassis
   C. back of the on-off switch
   D. top of the power supply transformer

3. What type of power transformer is used in power supplies?

   A. step down
   B. impedance matching
   C. one to one
   D. step up

4. Which type of filter is the most efficient?

   A. RC filter
   B. LC filter
   C. M filter
   D. PI filter

5. What is a disadvantage of a bridge-type rectifier circuit?

   A. expensive to build
   B. low voltage output
   C. requires a good amount of filtering
   D. require a center-tapped transformer

6. What causes hum in the audio and raster of a T.V. set?

   A. open filter chokes
   B. bad transformer
   C. bad filter capacitors
   D. open bleeder resistors

7. What is the main advantage of a half-wave rectifier power supply?

   A. relatively inexpensive to make
   B. higher output voltage
   C. needs less filtering
   D. does not require a transformer

8. What type of filter is most often used in T.V. sets?

   A. RC network
   B. PI network
   C. LC network
   D. M filter

9. What is the best method for checking a possibly bad filter capacitor?

   A. ohmmeter
   B. voltmeter
   C. capacitor checker
   D. substitution

10. Which type of power supply produces the highest voltage?

   A. full wave
   B. bridge rectifier
   C. center tapped half wave
   D. half-wave voltage doubler

LAP TEST ANSWER KEY: LOW-VOLTAGE POWER SUPPLY TROUBLES

1. B
2. B
3. D
4. B
5. A
6. C
7. A
8. A
9. D
10. D

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Date Published: 12/20/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Low-Voltage Failure

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV low-voltage power supply, identify the low-voltage circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Low-Voltage Failure" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

Transistor TV Training Course, Middleton.

PROCEDURE:

1. Read Chapter 12, "Low-Voltage Power Supplies," in Transistor TV Training Course.
2. Answer the review questions at the end of the chapter.
3. Check your answers with the answer key.
4. Read Lesson 16 in the response manual.
5. Complete the Practice Exercises for Lesson 16.
6. Check your answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): B. Vetter

File Code: 77.04.06.07.A2-0

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of Low-Voltage Failure

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the low-voltage power supply of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Low-Voltage Failure" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop 16, Low-Voltage Failure.

Projector.

PROCEDURE:

1. View Film Loop 16 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77-04.06.08.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Low-Voltage Failure

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the low-voltage power supply of a TV set.

EVALUATION PROCEDURE:

The objective of this activity will be evaluated by a unit performance test.

Successfully complete at least 80% of the items on a multiple-choice test about this LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Television set
Capacitor checker
Hand tools
Soldering & desoldering tools
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).

   NOTE: FOLLOW SAFE PRACTICES AND PROCEDURES!

3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, [illegible]. Vetter

Student: ____________________ File Code: 77.04.06.06.A2-2
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Date: ____________________ Date Published: 11/29/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

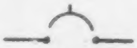
LAP TEST: LOW-VOLTAGE FAILURE/SYMPTOMS OF AND DIAGNOSING LOW-VOLTAGE FAILURE

77.04.06.06.

1. What device is used for regulation in a transistor type power supply?

   A. zener diode
   B. germanium diode
   C. tube
   D. transformer

2. What does the following symbol represent?



   A. fuse
   B. circuit breaker
   C. temporary jumper
   D. fusable resistor

3. What precaution should be taken when replacing filter capacitors in a T.V. set?

   A. polarity
   B. working voltage
   C. physical size
   D. connections

4. What type of T.V. power supply is the most efficient?

   A. voltage doubler
   B. full-wave
   C. bridge
   D. half-wave

77.04.06.07.

5. What will the raster look like on a set with a low voltage problem?

   A. shrunken picture
   B. trapezoidal picture
   C. hum bars
   D. distorted sound

6. What is the normal troubleshooting procedure for a power supply?

   A. ammeter
   B. low voltage probe
   C. substitution
   D. voltage measurement

7. What section will be affected first by low voltage?

   A. vertical
   B. video
   C. audio
   D. horizontal

8. What else can cause hum in the video besides the power supply?

   A. cathode to heater short in a tube
   B. shorted video output
   C. CRT
   D. misaligned I.F.

77.04.06.08.

9. What causes low voltage in a power supply?

   A. leaky capacitors
   B. bad transformer
   C. open resistor
   D. shorted component

10. What will a hum bar do to the raster of a T.V. set?

   A. shrink it
   B. nothing
   C. bend it
   D. make it trapezoidal in shape

77.04.06.06.A2-2
77.04.06.07.A2-2
77.04.06.08.A2-2

LAP TEST ANSWER KEY: LOW-VOLTAGE FAILURE/SYMPTOMS OF AND DIAGNOSING LOW-VOLTAGE FAILURE

LAP 06	1.	A
	2.	B
	3.	A
	4.	C
LAP 07	5.	A
	6.	D
	7.	D
	8.	A
LAP 08	9.	A
	10.	C

File Code: 77.04.06.09.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Television Set Adjustments

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, identify the control in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Television Control Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

Photofact Television Course, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 17, "Receiver Controls—Application and Adjustment," in Photofact Television Course.
2. Answer the review questions at the end of Chapter 17.
3. Check your answers with the answer key.
4. Read Lesson 17 in the response manual.
5. Complete the Practice Exercises for Lesson 17.
6. Check your answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Television Control Troubles

OBJECTIVE:

Observe typical symptoms commonly related to misadjustment of the controls of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Television Control Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop 17, Adjustments.

Projector.

PROCEDURE:

1. View Film Loop 17 indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77.04.06.11.A2-0

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Television Control Troubles

OBJECTIVE:

Diagnose and correct problems related with the controls of a TV set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

TSD Trainer or television set
Hand tools
Soldering & desoldering tools
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s)
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction.
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

77.04.06.09.A2-2
77.04.06.10.A2-2

Student: ______________________ File Code: 77.04.06.11.A2-2

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: TELEVISION SET ADJUSTMENTS/ TELEVISION CONTROL TROUBLES AND DIAGNOSING TELEVISION CONTROL TROUBLES

77.04.06.09.

1. What is the source of snow in a T.V. tuner?

   A. oscillator
   B. I.F. amp
   C. mixer
   D. R.F. amp

2. What channels are in the UHF spectrum?

   A. 2-6
   B. 14-84
   C. 7-14
   D. 2-13

77.04.06.10.

3. Which section of a T.V. set's I.F. strip is the most difficult to troubleshoot?

   A. second I.F.
   B. detector
   C. first I.F.
   D. third I.F.

4. A good method to isolate trouble to the I.F. section is to:

   A. replace the second I.F. amp
   B. replace the first I.F. amp
   C. replace the video detector
   D. vary the contrast control

77.04.06.11.

5. What section should be checked if a T.V. set displays a fuzzy picture or a loss of detail?

   A. sound take-off
   B. video
   C. I.F. amp
   D. video detector

6. The raster is normal, but a buzz exists in the audio and the video is both bent and contrasty. What section might be the problem?

   A. I.F. amp
   B. video amp
   C. A.G.C.
   D. tuner

7. What might be the cause of this problem: normal sound, but no video or raster?

   A. bad video output
   B. bad video amp
   C. bad CRT
   D. bad A.G.C.

8. If a T.V. is displaying an excessive amount of snow, what section is probably causing the trouble?

   A. mixer
   B. R.F. amp
   C. oscillator
   D. first I.F. amp

9. If a T.V. set has an A.G.C. problem, what should be checked first?

   A. antenna
   B. power supply
   C. tubes
   D. A.G.C. control setting

10. The audio is very weak but the volume control has some effect. Both the video and raster are normal. What is the suspected trouble?

   A. bad sound I.F.
   B. bad third I.F. amp
   C. bad video output
   D. bad audio output

77.04.06.09.A2-2
77.04.06.10.A2-2
77.04.06.11.A2-2

LAP TEST ANSWER KEY: TELEVISION SET ADJUSTMENTS/TELEVISION CONTROL TROUBLES AND DIAGNOSING TELEVISION CONTROL TROUBLES

LAP 09	1.	A
	2.	B
LAP 10	3.	A
	4.	D
LAP 11	5.	C
	6.	C
	7.	C
	8.	B
	9.	D
	10.	A

File Code: 77.04.06.12.A2-0

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Audio/Video/Sweep Power Supply Circuit Troubles

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a TV set, determine if trouble exists in the audio, video, sweep, or power supply section.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Audio/Power Supply Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 18 in the response manual.
2. Complete the Practice Exercises for Lesson 19.
3. Check the answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Date Published: 12/20/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Symptoms of Audio/Video/Sweep/Power Supply Circuit Troubles

OBJECTIVE:

Observe typical symptoms commonly related to malfunctions in the audio, video, sweep and power supply section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Sweep/Power Supply Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.

Film Loop 18, Symptom Set III.

Projector.

PROCEDURE:

1. View Film Loop 18 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77.04.06.14.A2-0

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Audio/Power Supply Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the audio or power supply section of a TV set.

EVALUATION PROCEDURE:

The objective of this activity will be evaluated by a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Sweep/Power Supply Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Cathode ray tube checker
Hand tools
High voltage probe (30 kv)
Solder & desoldering tools
Television Analyst, B & K Model 1077B
Transistor checker
Vacuum tube checker
Television set

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77.04.06.15.A2-0

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Video/Power Supply Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the video or power supply section of a TV set.

EVALUATION PROCEDURE:

The objective of this activity will be evaluated by a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Sweep/Power Supply Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Cathode ray tube checker
Hand tools
High voltage probe (30 kv)
Soldering & desoldering tools
TSD Trainer or television set
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

File Code: 77.04.06.16.A2-0

Date Published: 12/20/76

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Diagnosing Sweep/Power Supply Troubles

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the sweep or power supply section of a TV set.

EVALUATION PROCEDURE:

The objective of this activity will be evaluated by a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
High voltage probe (30 kv)
Soldering & desoldering tools
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Transistor checker

PROCEDURE

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) and have the instructor verify it.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.06.12.A2-2
77.04.06.13.A2-2
77.04.06.14.A2-2
77.04.06.15.A2-2
77.04.06.16.A2-2

Date: ______________________ Date Published: 11/29/77

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: AUDIO/VIDEO/SWEEP/POWER SUPPLY CIRCUIT TROUBLES AND SYMPTOMS/DIAGNOSING AUDIO/POWER SUPPLY TROUBLES, VIDEO/POWER SUPPLY TROUBLES AND SWEEP/POWER SUPPLY TROUBLES

77.04.06.12.

1. The video and raster are normal, but there is no background noise or soft hum. What section should be checked?

   a. audio output
   b. audio detector
   c. audio amp
   d. audio I.F.

2. If the raster is normal, but the audio has some atmospheric sound, and the video is gone, what section should be checked?

   a. R.F. amp
   b. the mixer in the tuner
   c. the oscillator in the tuner
   d. third I.F. amp

77.04.06.13.

3. The sound is normal, but there is not enough brightness. What might cause this problem?

   a. vido amp
   b. CRT
   c. power supply
   d. A.G.C

4. A floating picture is caused by a bad?

   a. sync separator
   b. vertical integrator
   c. A.G.C.
   d. horizontal A.F.C.

5. What will cause the raster to be normal and both the video and audio to be gone?

   a. bad video detector
   b. A.G.C.
   c. power supply
   d. video output

6. The sound and raster are normal, but there is no video. However, there is some change when varying the contrast control. This problem could be caused by:

   a. video output
   b. video amp
   c. third I.F. amp
   d. video detector.

77.04.06.14.

7. No sound and no raster is usually caused by:

   a. high voltage and power supply failure
   b. low voltage power supply failure
   c. malfunctioning yoke
   d. malfunctioning I.F. amp

77.04.06.15.

8. A bent and contrasty picture is caused by the:

   a. power supply
   b. I.F.
   c. A.G.C.
   d. yoke

9. Severe snow is caused by a bad:

   a. mixer
   b. first I.F. amp
   c. oscillator
   d. R.F. amp

77.04.06.16.

10. What causes loss of horizontal sync in a T.V. set?

   a. sync separator
   b. A.G.C.
   c. A.F.C.
   d. A.C.C.

77.04.06.12.A2-2
77.04.06.13.A2-2
77.04.06.14.A2-2
77.04.06.15.A2-2
77.04.06.16.A2-2

LAP TEST ANSWER KEY: AUDIO/VIDEO/SWEEP/POWER SUPPLY CIRCUIT TROUBLES AND SYMPTOMS/DIAGNOSING AUDIO/POWER SUPPLY TROUBLES, VIDEO/POWER SUPPLY TROUBLES AND SWEEP/POWER SUPPLY TROUBLES

LAP 12	1.	a
	2.	c
LAP 13	3.	b
	4.	a
	5.	a
	6.	b
LAP 14	7.	b
LAP 15	8.	c
	9.	d
LAP 16	10.	c

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UNIT POST TEST: TELEVISION HIGH-VOLTAGE AND POWER SUPPLY TROUBLES

77.04.06.01.

1. The high voltage rectifier tube obtains its filament voltage from the:

   A. power transformer.
   B. low voltage power supply.
   C. voltage divider circuit.
   D. flyback transformer.

2. What is another term for a raster being "over deflected"?

   A. low focus
   B. over scan
   C. blooming
   D. low-high voltage

3. The focus rectifier obtains its filament voltage from the:

   A. low voltage supply.
   B. flyback transformer.
   C. power transformer.
   D. filament transformer.

4. Any problem that prevents the raster from being its correct size and shape can be considered a:

   A. video problem.
   B. raster problem.
   C. low voltage power supply problem.
   D. high voltage problem.

5. What type of high voltage regulation is found in a black and white set?

   A. shunt regulation
   B. horizontal regulation
   C. horizontal bias regulation
   D. none

77.04.06.02.

6. The output of the horizontal drive stage goes to which of the following?

   A. flyback transformer
   B. horizontal oscillator
   C. horizontal output
   D. high voltage rectifier

7. The filament voltage on most rectifier tubes in a color T.V. set is:

   A. 6 V.
   B. 12 V.
   C. 1 V.
   D. 3 V.

77.04.06.03.

8. What will cause the high voltage to become too high?

   A. output
   B. regulator
   C. flyback
   D. damper

9. What is the function of the damper section in a high voltage system?

   A. produce boosted B+
   B. produce focus voltage
   C. produce the yoke wave pulse
   D. produce a dampened waveform

10. Where can the current of the horizontal output tube be monitored?

   A. in the grid
   B. in the flyback transformer
   C. in the plate
   D. in the cathode

77.04.06.04.

11. What is the best method of checking components in the high voltage section?

   A. examination
   B. ohmeter
   C. voltmeter
   D. high voltage probe

12. Which of the following is a high voltage problem?

    A. no sound
    B. no sync
    C. no raster
    D. video

13. What section in the horizontal sweep will cause a raster failure?

    A. oscillator only
    B. output only
    C. damper only
    D. all of them

14. Will high voltage be developed if the high voltage lead is not connected to the picture tube?

    A. yes
    B. no
    C. only if it is grounded
    D. only if it is in a color set

15. Can high voltage waveforms be viewed with a scope?

    A. only with a high voltage probe
    B. yes
    C. no
    D. only in a black and white set

77.04.06.05.

16. What is the main function of the rectifier in a power supply?

    A. step up the voltage
    B. convert DC to AC
    C. convert AC to DC
    D. step down the voltage

17. What is the main advantage of a half-wave rectifier power supply?

    A. does not require a transformer
    B. needs less filtering
    C. relatively inexpensive to make
    D. higher output voltage

18. Where is the interlock located on a T.V. set?

    A. top of the power supply transformer
    B. the back cover
    C. back of the on-off switch
    D. rear of the chassis

19. Which type of filter is the most efficient?

   A. LC filter
   B. M filter
   C. RC filter
   D. PI filter

20. What type of power transformer is used in power supplies?

   A. step down
   B. impedance matching
   C. one to one
   D. step up

77.04.06.06.

21. How can a circuit breaker be checked for workability while the power is off?

   A. substitution
   B. B & K analyst
   C. ohmmeter
   D. ammeter

22. What precaution should be taken when replacing filter capacitors in a T.V. set?

   A. physical size
   B. connections
   C. working voltage
   D. polarity

23. What device is used for regulation in a transistor type power supply?

   A. germanium diode
   B. tube
   C. zener diode
   D. transformer

24. What is another name for a power supply?

   A. AC-DC converter
   B. voltage divider
   C. step-up supply
   D. step-down supply

25. What type of T.V. power supply is the most efficient?

    A. bridge
    B. half-wave
    C. full-wave
    D. voltage doubler

77.04.06.07.

26. What section will be affected first by low voltage?

    A. horizontal
    B. video
    C. audio
    D. vertical

27. What else can cause hum in the video besides the power supply?

    A. CRT
    B. misaligned I.F.
    C. cathode to heater short in a tube
    D. shorted video output

77.04.06.08.

28. What is the most common cause of low voltage in a power supply?

    A. open resistor
    B. leaky capacitors
    C. bad transformer
    D. shorted component

29. What is the next step in troubleshooting a power supply when the DC output measures zero?

    A. substitute components
    B. check the AC supply
    C. check diodes
    D. check the chassis for DC shorts

30. If a dropping resistor in a power supply was running abnormally hot, what should be checked?

    A. the rectifier
    B. the filter capacitor
    C. the shorted component that it supplies voltage to
    D. the resistor

77.04.06.09.

31. Does the yoke have any relationship to the video of a T.V. set?

    A. yes, in all sets
    B. only in color sets
    C. no
    D. only in black and white sets

32. What is the source of snow in a T.V. tuner?

    A. R.F. amp
    B. oscillator
    C. I.F. amp
    D. mixer

33. In which section of a T.V. is the contrast control located?

    A. CRT
    B. I.F. amp
    C. video detector
    D. video amp

77.04.06.10.

34. If the T.V. set has too much gain, the raster will be:

    A. snowy.
    B. normal.
    C. washed out
    D. bent.

35. A good method to isolate trouble to the I.F. section is to:

    A. vary the contrast control.
    B. replace the second I.F. amp.
    C. replace the first I.F. amp.
    D. replace the video detector.

77.04.06.11.

36. When the video detector fails in a T.V. set, it gives the same symptoms as a bad:

    A. second I.F. amp.
    B. third I.F. amp.
    C. first I.F. amp.
    D. sound take-off transformer.

37. The raster is normal, but a buzz exists in the audio and the video is both bent and contrasty. What section might be the problem?

    A. I.F. amp
    B. tuner
    C. A.G.C.
    D. video amp

38. If a T.V. set has an A.G.C. problem, what should be checked first?

    A. antenna
    B. A.G.C. control setting
    C. power supply
    D. tubes

39. The audio is very weak but the volume control has some effect. Both the video and raster are normal. What is the suspected trouble?

    A. bad sound I.F.
    B. bad video output
    C. bad audio output
    D. bad third I.F. amp

40. What might be the cause of this problem: normal sound, but no video or raster?

    A. bad CRT
    B. bad video amp
    C. bad video output
    D. bad A.G.C.

77.04.06.12.

41. If the raster is normal, but the audio has some atmospheric sound, and the video is gone, what section should be checked?

    A. The mixer in the tuner.
    B. The oscillator in the tuner.
    C. third I.F. amp
    D. R.F. amp

42. The sound and raster are normal, but there is no video. However, there is some change when varying the contrast control. This problem could be caused by:

    A. third I.F. amp
    B. video output
    C. video amp
    D. video detector

43. Loss of vertical sync with a hammerhead pattern usually indicates a malfunctioning:

    A. sync separator
    B. A.G.C.
    C. vertical sync amp
    D. video amp

77.04.06.13.

44. What will cause the raster to be normal and both the video and audio to be gone?

A. bad video detector
B. A.G.C.
C. power supply
D. video output

45. A floating picture is caused by a bad:

A. sync separator.
B. vertical integrator.
C. horizontal A.F.C.
D. A.G.C.

77.04.06.14.

46. The raster is normal, but the audio and video are weak. There is also some slight snow. What might be the cause?

A. R.F. amp
B. A.G.C.
C. video detector
D. I.F. amp

77.04.06.15.

47. A bent and contrasty picture is caused by the:

A. power supply.
B. A.G.C.
C. I.F.
D. yoke.

77.04.06.16.

48. What will cause loss of raster in a T.V. with normal audio?

A. horizontal sweep
B. yoke
C. horizontal A.F.C.
D. vertical output

49. What section causes a picture to "bloom"?

A. low voltage power supply
B. video amp
C. high voltage power supply
D. weak picture tube

50. What causes loss of horizontal sync in a T.V. set?

A. A.G.C.
B. A.F.C.
C. sync separator

UNIT POST-TEST ANSWER KEY: TELEVISION HIGH VOLTAGE AND POWER SUPPLY TROUBLES

LAP 01	1.	D
	2.	C
	3.	B
	4.	B
	5.	D
LAP 02	6.	C
	7.	D
LAP 03	8.	B
	9.	A
	10.	D
LAP 04	11.	A
	12.	C
	13.	D
	14.	A
	15.	A
LAP 05	16.	C
	17.	C
	18.	D
	19.	A
	20.	D
LAP 06	21.	C
	22.	D
	23.	C
	24.	B
	25.	A
LAP 07	26.	D
	27.	C
LAP 08	28.	B
	29.	B
	30.	C
LAP 09	31.	C
	32.	B
	33.	D
LAP 10	34.	D
	35.	A
LAP 11	36.	B
	37.	C
	38.	B
	39.	A
	40.	A
LAP 12	41.	B
	42.	C
	43.	C
LAP 13	44.	A
	45.	A
LAP 14	46.	D
LAP 15	47.	B
LAP 16	48.	A
	49.	C
	50.	B

Student: ____________________ **File Code:** 77.04.06.00.A1-5

Date: ____________________ **Date Published:** 11/25/75

Family Pay Number: __________ Sex: M F (Circle 1)

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UNIT PERFORMANCE TEST: TELEVISION HIGH-VOLTAGE AND POWER SUPPLY TROUBLES.

OBJECTIVE 1:

The student will diagnose malfunctions with regard to high voltage section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunction in the high voltage section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the high voltage section.

The term "high voltage section" refers to the following:

1. horizontal sweep section
2. picture tube
3. low voltage power supply
4. video output section

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. no high voltage
2. no low voltage
3. no raster
4. poor audio
5. raster distortion

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron, B & K television analyst, tube checker, volt-ohmmeter, hand tools, high-voltage probe (30 kv), desoldering tools and replacement components.

Student: ______________________ File Code: 77.04.06.00.A1-5

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Family Pay Number: ____________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose high voltage failures.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to high voltage		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to high voltage		
section.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to high voltage failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to high voltage failure.		

(Checklist continued)

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

Student must meet criterion on all line items to obtain an overall score of satisfactory.

1.

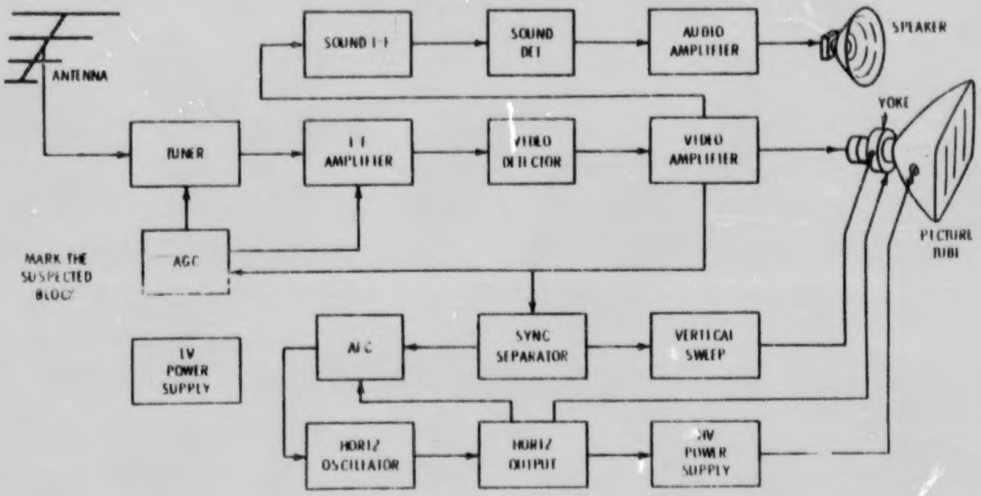
BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2.

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**
DIAGNOSIS (suspected block) and comments:		

3.


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
MARK THE SUSPECTED BLOCK
AGC
AFC
SYNC SEPARATOR
VERTICAL SWEEP
LV POWER SUPPLY
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

CORRECTIVE ACTION (suggested or taken):

When your diagnosis is complete, continue with the remainder of the lesson.

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

check for audio
check for video
check for raster
check for snow
checks for normal raster

OBJECTIVE 2: Troubleshooting

Line item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

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Learning Experience Guide

UNIT: INTRODUCTION TO COLOR TELEVISION

RATIONALE:

The television service person needs knowledge and skills to effectively repair and adjust color televisions. To effectively repair the color television requires that the picture tube first have a proper color setup. Knowledge about control functions and adjustment procedures is needed before practice in making the adjustments. Color setup adjustments are important because the television screen is used as an indicator of chroma section malfunctions.

PREREQUISITES:

Unit: 77.04.06. Television High-Voltage and Power Supply Troubles

OBJECTIVE:

Perform color television picture tube setup adjustments that include degaussing, beam convergence, beam intensity and screen purity according to given specifications and using appropriate tools, equipment and procedures.

RESOURCES:

Printed Materials

Color Television Diagnosis Sheets.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Color-TV Training Manual. Howard W. Sams Editorial Staff, Howard W. Sams and Company, Inc., 1974.
Transistor TV Training Course. Robert G. Middleton, Howard W. Sams and Company, Inc., 1973.

Audio/Visuals

Super 8 Sound Film:

Television Symptom Diagnosis Series TSD-133. (Film Loop Nos. 19, 20, 21, 22, 23, 25, 26), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

Principal Author(s): L. Leland, B. Vetter

RESOURCES: (continued)

Equipment

Degaussing coil
Color T.V.
Alignment tool set
Keyed rainbow/Bar-Dot generator
Service Master 99SM kit, or equivalent; Xcelite 99SM kit, Jenson Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 West Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, KT-185Y, Hickok Teaching Systems, Inc., Woburn, Massachusetts.
Super 8 Sound Film Projector, Model 60, Hickok Teaching Systems, Inc.
High voltage probe (30 kv)
Mirror

GENERAL INSTRUCTIONS:

This unit consists of 30 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPS for the unit by following steps 3 through 6.
(8) In this unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "Evaluation Procedures."
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 The Color Television System
.02 Color Mixing
.03 Transistor Color-TV Receivers
.04 Adjusting Color Television Controls
.05 The Color Set Block Diagram
.06 Color Section Circuitry
.07 Observing Color Patterns
.08 Residual Magnetism
.09 Degaussing Procedure
.10 Diagnosing Need for Degaussing
.11 Degaussing the Set
.12 Adjusting Picture Tube Purity
.13 Purity Setup
.14 Purity Adjustment Procedures
.15 Diagnosing Need for Purity Adjustment
.16 Static Convergence
.17 Static Convergence Adjustments
.18 Static Convergence Procedures
.19 Diagnosing Need for Static Convergence
.20 Dynamic Convergence
.21 Dynamic Convergence Adjustments
.22 Dynamic Convergence Procedures
.23 Diagnosing Need for Dynamic Convergence
.24 Adjusting the Gray Scale
.25 Gray-Scale Controls
.26 Procedures for Adjusting the Gray Scale
.27 Diagnosing Need for Adjusting the Gray Scale
.28 Color Television Setup
.29 Color Setup Procedures
.30 Performing Color Setup

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

When you finish reading this unit guide, go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

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UNIT PRETEST: INTRODUCTION TO COLOR TELEVISION

77.04.07.01.

1. What are the three basic colors used in color T.V. circuitry?

   A. red, yellow, and green
   B. blue, yellow, and red
   C. green, blue, and magenta
   D. red, green, and blue

2. What color is developed when the basic colors of T.V. circuitry are mixed?

   A. white
   B. blue
   C. black
   D. reddish yellow

3. Colors without any white in them are called:

   A. saturated colors.
   B. desaturated colors.
   C. base colors.
   D. pastel colors.

4. What is the frequency of the color signal carrier being transmitted?

   A. 15,750 kHz
   B. 3.58 mHz
   C. 455 kc
   D. 41.25 mHz

5. A blue-green color is defined as:

   A. pastel.
   B. magenta.
   C. cyan.
   D. saturated.

77.04.07.02.

6. What color dots will the green gun of a color CRT activate?

   A. red and green
   B. all colors
   C. green only
   D. blue and green

7. What activates the color circuitry in a color set?

   A. A.G.C.
   B. the power supply
   C. horizontal sync pulse
   D. the color burst signal

8. What is another term that may be used for "hue"?

   A. brightness
   B. saturated color
   C. desaturated color
   D. tint

77.04.07.03.

9. What color is obtained by mixing red and blue together?

   A. yellow
   B. cyan
   C. magenta
   D. blue-black

10. Another term used to describe the power of color on a CRT is:

   A. hue
   B. brightness
   C. magenta
   D. saturation

77.04.07.04.

11. What controls the gain of the chroma signal in the color circuitry?

   A. oscillator pulse
   B. chroma amp
   C. A.C.C.
   D. A.G.C.

12. What signal or pulse is responsible for gating the burst amp in a tube chroma circuit?

   A. 3.58 MHZ
   B. color killer
   C. flyback
   D. A.C.C.

13. When viewing a video signal with a scope, where is the color burst signal located?

   A. before the horizontal-sync pulse
   B. in the video information
   C. after the horizontal-sync pulse
   D. in the sync-pulse

14. What type of oscillator does a color T.V. use for the 3.58 MHZ signal?

    A. BFO
    B. hartley
    C. tuned plate, tuned grid
    D. crystal

15. What signal in a color section activates the color killer to switch on the color I.F. amp?

    A. A.G.C. pulse
    B. color-sync
    C. horizontal-sync pulse
    D. color burst

77.04.07.05.

16. The black and white portion of a color television set is called:

    A. non-chroma
    B. chroma
    C. monochrome
    D. chromacolor

17. What turns on the color killer circuit to enable it to pass color information?

    A. flyback pulse
    B. color burst
    C. A.C.C.
    D. 3.58 mHz oscillator

18. What part of the chroma section controls the gain of the color intensity?

    A. burst amp
    B. A.G.C.
    C. A.C.C.
    D. color killer

19. What is another term used for color I.F. stages in a color T.V.?

    A. demodulator
    B. burst amp
    C. 3.58 mHz oscillator
    D. color killer

20. Before a color T.V. is able to tune-in a good color picture, it must have:

    A. a good station transmitting color.
    B. a solid state chassis.
    C. a good black and white picture.
    D. an automatic degausser.

77.04.07.06.

21. Referring to figure #1 of the T.V. test pamphlet, what is the problem with this picture of the color bars?

    A. nothing
    B. not enough red
    C. inadequate amount of green
    D. too much blue

22. What is wrong with the picture in figure #3 of the T.V. test pamphlet?

    A. no G- Y signal
    B. 3.58 oscillator
    C. no R- Y signal
    D. no blue

23. What would cause a picture on a color T.V. screen to look like figure #4 in the T.V. test pamphlet?

    A. vertical hold not adjusted properly
    B. 3.58 mHz oscillator off frequency
    C. misadjusted horizontal hold
    D. A.C.C. set too high

24. What is wrong with figure #6 in the T.V. test pamphlet?

    A. 60 Hz hum bar
    B. no blue
    C. too much green
    D. too much red

25. What may be the cause of the problem exhibited in figure #8 in the T.V. test pamphlet?

    A. video amp
    B. power supply
    C. A.G.C.
    D. sync-separator

77.04.07.07.

26. What type of color T.V. does not require degaussing?

    A. 14" and smaller
    B. 25" only
    C. 19" and smaller
    D. all types require it

27. When should a black and white T.V. set be degaussed?

    A. after installation
    B. when it becomes impure
    C. never
    D. when the CRT is replaced

28. What color should the screen be when adjusted for purity?

    A. blue
    B. red
    C. green
    D. yellow

77.04.07.08.

29. How long should a degaussing coil be left on?

    A. as short a period of time as possible
    B. 25 seconds or more
    C. any length of time is okay
    D. at least an hour

30. When is the automatic degaussing circuit activated?

    A. when the set is first turned on
    B. while the set is on
    C. when the set is turned off
    D. when the set has cooled off

77.04.07.09.

31. When should a T.V. be degaussed?

    A. every 6 months
    B. every time it is turned on
    C. when it needs it
    D. only after installation

32. What part of the screen is normally degaussed with a coil?

    A. bottom
    B. front
    C. top
    D. back

33. At what distance should a person be when degaussing a screen?

A. 4 inches
B. 5 - 7 feet
C. one foot
D. 4 - 6 feet

34. What is the last step in degaussing a T.V. before unplugging the coil?

A. move the coil over and degauss the sides and bottom
B. rotate the coil away from the screen
C. turn the edge of the coil towards the screen
D. back up from the screen

35. What is incorporated in new T.V. sets to remove the effects of the earth's magnetic field on the purity of the screen?

A. a single gun CRT
B. slip-rings for purity
C. a non-magnetic picture tube
D. automatic degaussing circuit

77.04.07.10.

36. What color is developed when the basic colors of a color T.V. set are mixed?

A. white
B. blue
C. black
D. reddish yellow

37. Colors with white in them are called:

A. saturated colors.
B. desaturated colors.
C. base colors.
D. pastel colors.

38. What color is obtained by mixing red and blue together?

A. blue-black
B. cyan
C. yellow
D. magenta

39. When viewing a video signal with a scope, where is the color burst signal located?

A. in the video information
B. before the horizontal sync pulse
C. after the horizontal sync pulse
D. in the sync-pulse

40. What would happen to the color if the color killer control was set too high?

A. video loss
B. no affect on the color
C. no color
D. opens up the chroma circuit

77.04.07.11.

41. The purity rings of a color T.V. are located:

A. on the yoke.
B. on the neck of the picture tube.
C. on the chassis.
D. on the convergence board.

42. Which of the following devices is used in the purity adjustment to move the purity pattern on the screen?

A. service switch
B. purity rings
C. centering rings
D. degaussing circuit

43. What material is used to coat the inside of a color CRT screen?

A. phosphor
B. light-emitting diodes
C. photo-electric cells
D. bacteria

44. What is placed in a color CRT to prevent the electron beam from striking other dots adjacent to it?

A. purity ring
B. aquadag
C. shadow mask
D. yoke position control

45. How are the blue and green purity levels checked when making a set-up?

A. the blue and green are automatically set-up
B. cannot be done
C. turn the red screen off
D. turn the red, blue and green screen up

77.04.07.12.

46. What must be absent to perform good purity adjustment?

    A. color
    B. hi-voltage
    C. the video
    D. the red gun

47. What is done to obtain a red purity pattern in the middle of the screen?

    A. the service switch is used
    B. the purity rings are adjusted
    C. the yoke is slid back
    D. the color killer is turned up

77.04.07.13.

48. What color should the screen be when doing a purity adjustment?

    A. green
    B. blue
    C. red
    D. blank

49. Refer to figure #9 in the T.V. Test Pamphlet. Which number represents the purity rings?

    A. 4
    B. 3
    C. 2
    D. 1

50. What would happen if the yoke is pushed up too far forward when making a purity adjustment?

    A. picture distortion
    B. nothing
    C. fill out the screen
    D. discoloration of the screen

77.04.07.14.

51. How many convergence magnets are used for static set-up in a color set?

    A. 1
    B 2
    C. 4
    D. 3

52. What must be absent to perform good purity adjustment?

    A. video
    B. color
    C. red gun
    D. hi-voltage

53. By moving the blue magnet, which way will the green dot move?

    A. vertically
    B. horizontally
    C. up and down
    D. it won't move

54. What color should the screen be when doing a purity adjustment?

    A. blue
    B. green
    C. red
    D. black

55. What piece of test equipment is used to set the convergence on a color CRT?

    A. audio generator
    B. color generator
    C. bar dot generator
    D. R.F. generator

77.04.07.15.

56. For a convergence pattern, the generator is connected to the:

    A. I.F. amp.
    B. static magnets.
    C. purity rings.
    D. antenna terminals.

57. Which portion of a CRT screen does a static convergence primarily cover?

    A. the entire screen
    B. the outside edge
    C. the center
    D. the bottom and top only

58. How many magnets are used to control the red dot in a static set-up?

    A. three
    B. two
    C. one
    D. four

77.04.07.16.

59. How many convergence magnets are used for static set up in a color set?

    A. 2
    B. 3
    C. 4
    D. 1

60. What should be checked both during and after a static convergence set-up in a color CRT?

    A. purity
    B. dynamic convergence
    C. hi-voltage
    D. A.G.C. setting

77.04.07.17.

61. Which way does the red dot move when adjusting its magnet?

    A. up and down
    B. diagonally
    C. horizontally
    D. parallel with the green

62. Which way will the blue dot move when adjusting the blue dot magnet?

    A. parallel with the red and green
    B. vertically
    C. diagonally
    D. horizontally

63. By moving the blue magnet, which way will the green dot move?

    A. vertically
    B. it won't move
    C. horizontally
    D. diagonally

64. What color will develop when red and green dots converge at the same point?

    A. green
    B. red
    C. yellow
    D. blue

65. Which way will the green dot move when making a static set-up?

    A. diagonally
    B. vertically
    C. horizontally
    D. parallel to the red dot

77.04.07.18.

66. At what brightness level should a convergence be done?

    A. low
    B. high
    C. medium
    D. with a red screen

67. Why is convergence necessary in a color T.V. set?

    A. to provide better focus
    B. to have the guns meet in the same place at the same time
    C. to have the phosphor dots in the same place
    D. to provide better color

68. What type of convergence is done for the outside part of the picture tube?

    A. static
    B. dynamic
    C. magnetic
    D. purity convergence

69. What piece of test equipment is used to set the convergence on a color CRT?

    A. bar dot generator
    B. B & K analyst
    C. audio generator
    D. color generator

70. In doing a convergence set-up, what piece of test equipment is required?

    A. oscilloscope
    B. VOM
    C. bar-dot generator
    D. a mirror

77.04.07.19.

71. The process used to converge the outer part of the screen is called:

    A. static convergence.
    B. dynamic convergence.
    C. focus
    D. purity.

77.04.07.20.

72. When the horizontal blue-tilt control is properly adjusted, it produces horizontal white lines at the:

   A. bottom center of the screen.
   B. left center of the screen.
   C. right center of the screen.
   D. top center of the screen.

73. When the red/green vertical-tilt control is properly adjusted, it produces vertical yellow lines at the:

   A. bottom center of the screen.
   B. right center of the screen.
   C. top center of the screen.
   D. left center of the screen.

74. When the vertical blue-amplitude control is properly adjusted, it produces horizontal white lines at the:

   A. right center of the screen.
   B. bottom center of the screen.
   C. top centerof the screen.
   D. left center of the screen.

77.04.07.21.

75. An instrument which may be used for dynamic convergence is a:

   A. black and white test-pattern generator.
   B. oscilloscope.
   C. color-bar generator.
   D. cross-hatch generator.

77.04.07.22.

76. Where are the controls located to perform a dynamic convergence?

   A. neck of the picture tube
   B. convergence panel
   c. chassis
   D. yoke

77. When the vertical blue-tint control is properly adjusted, it will produce a horizontal white line at the:

   A. right center of the screen.
   B. top center of the screen.
   C. bottom center of the screen.
   D. left center of the screen.

78. The dynamic convergence is usually done on the:

A. outer portion of the screen.
B. top portion of the screen.
C. middle portion of the screen.
D. bottom portion of the screen.

79. It may be necessary to repeat steps in the dynamic convergence procedure to achieve:

A. brighter yellow lines.
B. the proper gray mode.
C. finer quality convergence.
D. less magnetic effects.

80. The aperature mask in a color CRT is constructed of:

A. plastic.
B. fiberglass.
C. glass.
D. metal.

77.04.07.23.

81. When receiving a black and white transmission, the CRT of a color set should:

A. produce various shades of gray.
B. produce color snow.
C. go blank, because of a lack of color.
D. become dark gray in color.

82. When setting up for the gray scale, the controls should first be placed:

A. on full.
B. mid-range.
C. in the off position.
D. in equal balance of each other.

83. What can be substituted for a service switch when setting up a gray scale?

A. install a service switch
B. an unused channel
C. there is no substitute whatsoever
D. adjust the screen with the brightness control

84. An improper gray scale adjustment will affect:

A. color pictures only.
B. the sweep stability.
C. both color and black and white pictures.
D. black and white pictures only.

85. When using the service switch method of adjusting the gray scale, one should look for:

A. colored lines across the screen.
B. a gray screen.
C. a yellow screen.
D. a blue screen.

77.04.07.24.

86. What controls are used to set up the black and white temperature settings or the gray scale?

A. the screen controls
B. the drive controls
C. the triad intensity
D. the bias control

87. The gray scale adjustment can be checked by using the:

A. brightness control.
B. contrast control
C. hold controls.
D. tint control.

88. In setting the gray scale, the service switch is put in the:

A. raster position.
B. normal position.
C. service position.
D. set-up position.

89. The gray scale adjustment is made using the:

A. tint control.
B. drive controls.
C. brightness control.
D. screen controls.

77.04.07.25.

90. After varying the brightness in checking the gray scale, what is looked for on the screen?

    A. a color change
    B. shadows
    C. white dots or a crosshatch pattern
    D. flesh tones

77.04.07.26.

91. What can be substituted for service switch when setting up a gray scale?

    A. there is no substitution
    B. an unused channel
    C. adjust the screen with the brightness control
    D. install a service switch

92. Where are the screen controls located at in a color T.V. set?

    A. on the bottom of the chassis
    B. in front of the chassis
    C. the back of the chassis
    D. in the front of the T.V.

93. When the gray scale is properly adjusted, the three electron guns:

    A. have equal beam current.
    B. are cut off.
    C. produce equal light output.
    D. operate at their maximum output.

94. What controls are used to set up the black and white temperature settings for the gray scale?

    A. the screen controls
    B. the triad intensity
    C. the bias control
    D. the drive controls

95. What will happen to the picture if the gray scale is turned up too high?

    A. It creates a source of high voltage drainage.
    B. It distorts.
    C. It blooms.
    D. It loses color.

77.04.07.27.

96. Why is a good set-up necessary in color T.V. repair?

   A. to obtain a high level of purity
   B. to get a good gray scale
   C. to get a good color and black and white picture
   D. for good customer relations

97. The process of removing residual magnetism from a T.V. is called:

   A. degaussing.
   B. purification.
   C. converging.
   D. decoloring.

98. The three basic colors used in T.V. sets are:

   A. yellow, blue, and red.
   B. red, green, and cyan.
   C. magenta, blue, and orange.
   D. green, blue, and red.

99. Static convergence is achieved with:

   A. a degaussing coil.
   B. magnets around the neck of the picture tube.
   C. the convergence board.
   D. the screen color controls.

100. The objective of static convergence is to produce:

   A. a white horizontal line at the center of the screen.
   B. yellow lines at the edges of the screen.
   C. an all-red screen.
   D. white dots at the center of the screen.

77.04.07.28.

101. Color purity is adjusted by using the:

   A. color-convergence board.
   B. screen controls.
   C. deflection yoke and purity magnets.
   D. brightness control.

102. Static convergence is achieved:

   A. by using a color-bar generator.
   B. by using a full red screen.
   C. over the entire screen area.
   D. at the center of the screen only.

103. An instrument which can be used in the dynamic convergence procedure is a:

   A. cross-hatch generator.
   B. color-bar generator.
   C. oscilloscope.

104. The dynamic convergence adjustment has the greatest effect:

A. at the edges of the picture.
B. at the center of the screen.
C. on the blue screen.
D. on the degaussing pattern.

105. The gray scale adjustment should be made:

A. whenever the screen is discolored.
B. at the low brightness level.
C. using the purity rings.
D. using a bar-dot generator.

77.04.07.29

106. What source should be used for reference in doing a dynamic convergence and a color set-up?

A. sam's photofact
B. personal experience
C. a T.V. text book
D. a convergence manual

107. The process of removing residual magnetism from a T.V. is called:

A. convergence.
B. desaturizing.
C. purification.
D. degaussing.

108. How many magnets are used to control the red dot in a static set-up?

A. 4
B. 2
C. 3
D. 1

109. An improper gray scale adjustment will affect:

A. both color and black and white.
B. black and white picture only.
C. color picture only.
D. the sweep stability.

110. When receiving a black and white transmission, the CRT of a color set should:

A. become dark gray in color.
B. produce colored snow.
C. produce different shades of gray.
D. go blank due to a lack of color.

UNIT PRETEST ANSWER KEY: INTRODUCTION TO COLOR TELEVISION

LAP 01	1.	D
	2.	A
	3.	A
	4.	B
	5.	C
LAP 02	6.	C
	7.	D
	8.	D
LAP 03	9.	C
	10.	B
LAP 04	11.	C
	12.	C
	13.	C
	14.	D
	15.	D
LAP 05	16.	C
	17.	D
	18.	C
	19.	B
	20.	C
LAP 06	21.	A
	22.	D
	23.	C
	24.	D
	25.	C
LAP 07	26.	D
	27.	C
	28.	B
LAP 08	29.	A
	30.	A
LAP 09	31.	C
	32.	B
	33.	A
	34.	C
	35.	D
LAP 10	36.	A
	37.	B
	38.	D
	39.	C
	40.	C
LAP 11	41.	B
	42.	B
	43.	A
	44.	C
	45.	C
LAP 12	46.	C
	47.	C
LAP 13	48.	C
	49.	D
	50.	D
LAP 14	51.	C
	52.	A
	53.	D
	54.	C
	55.	C
LAP 15	56.	D
	57.	C
	58.	C
LAP 16	59.	C
	60.	A
LAP 17	61.	B
	62.	B
	63.	B
	64.	C
	65.	A
LAP 18	66.	A
	67.	B
	68.	B
	69.	A
	70.	C
LAP 19	71.	B
LAP 20	72.	B
	73.	C
	74.	B
LAP 21	75.	D
LAP 22	76.	B
	77.	B
	78.	A
	79.	C
	80.	D

UNIT PRETEST ANSWER KEY: INTRODUCTION TO COLOR TELEVISION

LAP 23 81. A
82. C
83. B
84. C
85. A

LAP 24 86. A
87. A
88. C
89. D

LAP 25 90. A

LAP 26 91. B
92. C
93. C
94. A
95. C

LAP 27 96. C
97. A
98. D
99. B
100. D

LAP 28 101. C
102. D
103. A
104. A
105. B

LAP 29 106. A
107. D
108. D
109. A
110. C

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Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: The Color Television System

OBJECTIVE:

Explain the color mixing system in television reception.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Adjusting Color Television Controls" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Sections 14-1, 14-2 in An Entry Into TV Servicing.
2. Answer review questions 1 through 8 on Page 117.
3. Check your answers with the answer key.
4. Read Chapter 1, "Colormetry, The Science of Determining and Specifying Colors," in the Color TV Training Manual.
5. Answer the review questions for Chapter 1.
6. Check your answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

File Code: 77.04.07.02.A2-0

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Color Mixing

OBJECTIVE:

Explain the function of each circuit in the chroma section of a color TV.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Adjusting Color Television Controls" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 19 in the response manual.
2. Complete the Practice Exercises for Lesson 19.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.07.01.A2-2
77.04.07.02.A2-2

Date: ______________________ Date Published: 11/29/77

Mountain-Plains Education &
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LAP TEST: THE COLOR TELEVISION SYSTEM/COLOR MIXING

77.04.07.01.

1. Colors without any white in them are called:

   a. saturated colors.
   b. pastel colors.
   c. desaturated colors.
   d. base colors.

2. Colors with white in them are called:

   a. desaturated colors.
   b. pastel colors.
   c. saturated colors.
   d. base colors.

3. What is the frquency of the color signal carrier being transmitted?

   a. 455 KC
   b. 15,750 KHZ
   c. 3.58 MHZ
   d. 41.25 MHZ

4. What color is developed when the basic colors of T.V. circuitry are mixed?

   a. black.
   b. blue.
   c. reddish yellow.
   d. white.

77.04.07.02.

5. What color dots will the green gun of a color CRT activate?

   a. blue and green.
   b. green only.
   c. red and green.
   d. all colors.

6. What color results when red and green are mixed together on a T.V. screen?

   a. magenta.
   b. blue.
   c. yellow.
   d. dark green.

7. What activates the color circuitry in a color set?

   a. the color burst signal.
   b. the power supply.
   c. horizontal sync pulse.
   d. A.G.C.

77.04.07.01.A2-2
77.04.07.02.A2-2

LAP TEST ANSWER KEY: THE COLOR TELEVISION SYSTEM/COLOR MIXING

LAP 01	1.	a
	2.	a
	3.	c
	4.	d
LAP 02	5.	b
	6.	c
	7.	a

File Code: 77.04.07.03.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Transistor Color-TV Receivers

OBJECTIVE:

Explain the differences between tube type and solid state color receivers.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test about this LAP.

RESOURCES:

Transistor TV Training Course, Middleton.

PROCEDURE:

1. Read Chapter 11, "Transistor Color-TV Receivers," in the above source.
2. Answer the review questions at the end of Chapter 11.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.07.03.A2-2

Date: ______________________ Date Published: 11/29/77

Family Education Program

LAP TEST: TRANSISTOR COLOR TV RECEIVERS

1. Brightness in a color receiver is determined by the amplitude of the?

   a. chroma signal.
   b. video signal.
   c. Y signal.
   d. I signal.

2. Saturation in a color receiver is determined by the amplitude of the?

   a. video signal.
   b. Y signal.
   c. I signal.
   d. chroma signal.

3. The video amplifier processes both the Y signal and the?

   a. chroma signal.
   b. black and white signal.
   c. I signal.
   d. Q signal.

4. By subtracting the Y signal from the complete signal, what type of signal is obtained?

   a. color burst.
   b. 3.58 reference.
   c. NTSC color signal.
   d. color difference signals.

5. In a transistor color receiver, the output of the Chroma Ref. Osc goes to the X demod. and the?

   a. R-Y amp.
   b. Z demod.
   c. chroma bandpass amp.
   d. osc control.

6. In a solid state receiver, the output of the color killer is fed to the?

   a. chroma bandpass amp.
   b. color killer detector.
   c. osc control.
   d. burst amp.

7. The 3.58 crystal is manufactured from what type of material?

   a. silicon.
   b. quartz.
   c. germanium.
   d. zinc.

8. In transistor receivers, good protection in the flyback system and high-voltage section is necessary to protect:

   a. damage to the CRT.
   b. high-voltage rectifier.
   c. horizontal-output transistors.
   d. the flyback from burning.

9. In a color receiver, the letters ATC stand for:

   a. automatic tuning control.
   b. automatic transistor control.
   c. automatic tint control.
   d. automatic tint conductor.

10. Some solid state color receivers feature a separate I-F system, thereby eliminating?

    a. 3.58 beat.
    b. 920 Khz beat.
    c. 43 Mhz signal.
    d. the need for a 3.58 Mhz signal at the color killer.

LAP TEST ANSWER KEY: TRANSISTOR COLOR TV RECEIVERS

1. c
2. d
3. a
4. d
5. b
6. a
7. b
8. c
9. c
10. b

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Adjusting Color Television Controls

OBJECTIVE:

Explain the affect that each color control has on the color television picture.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 19, Color Mixing.

Projector.

PROCEDURE:

1. View Film Loop 19 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.07.04.A2-2

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LAP TEST: ADJUSTING COLOR TELEVISION CONTROLS

77.04.07.04.

1. What color is obtained by mixing red and blue together?

    a. cyan.
    b. blue-black.
    c. magenta.
    d. yellow.

2. Another term used to describe the power of color on a CRT is:

    a. saturation.
    b. brightness.
    c. magenta.
    d. hue.

3. What controls affect the guns in a CRT?

    a. R- Y, B- Y, and G- Y controls.
    b. demodulator controls.
    c. drive controls.
    d. screen controls.

LAP TEST ANSWER KEY: ADJUSTING COLOR TELEVISION CONTROLS

1. c
2. b
3. d

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: The Color Set Block Diagram

OBJECTIVE:

Name the television color stages that form the chroma section, state the purpose of each and determine their location on a block diagram.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 14, Section 14-3 through 14-6, in An Entry Into TV Servicing.
2. Answer review questions 9 through 20 at the end of Chapter 14.
3. Check your answers with the answer key.
4. Read Chapter 3, "Make-up of The Color Picture Signal," in the Color TV Training Manual.
5. Answer the review questions at the end of Chapter 3.
6. Check your answers with the answer key.
7. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.07.05.A2-2

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LAP TEST: THE COLOR SET BLOCK DIAGRAM

1. The main purpose of the color demodulator in a color T.V. is to:

   a. remove the black and white signal.
   b. remove the color signal from the black and white.
   c. provide a sync-pulse.
   d. keep the 3.58 MHZ oscillator on frequency.

2. What is another term used for the color section of a T.V.?

   a. color amplifiers.
   b. chroma section.
   c. color sync unit.
   d. demodulator circuit.

3. What signal in a color section activates the color killer to switch on the color I.F. amp?

   a. horizontal-sync pulse.
   b. color-sync.
   c. 3.58 MHZ signal.
   d. A.G.C. pulse.

4. When viewing a video signal with a scope, where is the color burst signal located?

   a. after the horizontal-sync pulse.
   b. in the video information.
   c. before the horizontal-sync pulse.
   d. in the sync-pulse.

5. What would happen to the color if the color killer control was set too high?

   a. video loss.
   b. no color.
   c. no effect on the color.
   d. opens up the chroma circuit.

6. What part of the chroma section does the color killer section control?

   a. demodulator.
   b. burst amp.
   c. color sync.
   d. 3.58 MHZ oscillator.

7. What circuit can cause the color I.F. amp circuit to cease operation when a black and white signal is received?

   a. color oscillator.
   b. demodulator.
   c. color killer.
   d. video amp.

~~8. In what section of a tube-type chroma~~ circuit is the tint control located?

   a. 3.58 MHZ oscillator.
   b. chroma sync.
   c. burst amp.
   d. A.C.C.

9. What signal or pulse is responsible for gating the burst amp in a tube chroma circuit?

   a. flyback.
   b. 3.58 MHZ.
   c. A.C.C.
   d. color killer.

10. When the color pulse leaves the burst amplifier, it then goes to the:

   a. horizontal sweep.
   b. demodulators.
   c. A.G.C.
   d. A.C.C.

LAP TEST ANSWER KEY: THE COLOR SET BLOCK DIAGRAM

1. a
2. b
3. c
4. a
5. b
6. b
7. c
8. c
9. a
10. b

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Color Section Circuitry

OBJECTIVE:

Given the symptoms commonly related to color section of a television set, record observations and diagnosis.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Observing Color Patterns" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 26 in the response manual.
2. Complete the Practice Exercises for Lesson 26.
3. Check the answers with the answer key.
4. Proceed to the next LAP.

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Observing Color Patterns

OBJECTIVE:

Observe variations of color intensity and hue on a color television screen. Record descriptions of abnormal intensity and/or hue of the color bar pattern.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

TSD Trainer or color T.V.
Keyed rainbow/Bar-Dot generator.

PROCEDURE:

1. Have the instructor assign a work station to complete this LAP.
2. Connect the keyed rainbow/Bar-Dot generator to the antenna terminals of a color television set.
3. Adjust the generator and set to produce a normal color bar pattern.
4. Increase the color intensity control on the generator.
5. Observe symptoms displayed on the screen and describe them on the Color Television Diagnosis Sheet.
6. Decrease the color intensity control on the generator below normal.
7. Repeat Step 5.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

PROCEDURE: (continued)

8. Repeat Step 3.
9. Adjust television set hue control fully counter-clockwise.
10. Repeat Step 5.
11. Adjust the television set hue control fully clockwise.
12. Repeat Step 5.
13. Take the LAP test.

77.04.07.06.A2-2

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LAP TEST: COLOR SECTION CIRCUITRY/OBSERVING COLOR PATTERNS

77.04.07.06.

1. Which stage of a color T.V. compares the color I.F. signal to the color oscillator in order to produce the R- Y, B- Y, G- Y signal?

   a. burst amp.
   b. demodulator circuit.
   c. phase inverter.
   d. color modulator circuit.

2. The black and white portion of a color television set is called:

   a. monochrome.
   b. chroma.
   c. chromacolor.
   d. non-chroma.

3. What is another term used for color I.F. stages in a color T.V.?

   a. burst amp.
   b. 3.58 MHZ oscillator.
   c. bandpass amp.
   d. demodulator.

4. What part of the chroma section controls the gain of the color intensity?

   a. burst amp.
   b. A.C.C.
   c. A.G.C.
   d. color killer.

5. What turns on the color killer circuit to enable it to pass color information?

   a. color burst.
   b. flyback pulse.
   c. color killer.
   d. A.C.C.

77.04.07.07.

6. What is wrong with figure #7 in the T.V. test pamphlet?

   a. not enough blue.
   b. too much green.
   c. too much red.
   d. 60 HZ hum bar.

7. Referring to figure #1 of the T.V. test pamphlet, what is the problem with this picture of the color bars?

   a. too much blue.
   b. not enough red.
   c. inadequate amount of green.
   d. nothing.

8. What is wrong with figure #6 in the T.V. test pamphlet?

   a. 60 HZ hum bar.
   b. no blue.
   c. too much red.
   d. too much green.

9. What is wrong with the picture in figure #3 of the T.V. test pamphlet?

   a. no R- Y signal.
   b. no G - Y signal.
   c. no blue.
   d. 3.58 oscillator.

10. Referring to figure #5 in the T.V. test pamphlet, what section should be checked as the probable cause of this condition?

   a. G - Y amp.
   b. R - Y amp.
   c. burst amp.
   d. B - Y amp.

77.04.07.06.A2-2
77.04.07.07.A2-2

LAP TEST ANSWER KEY: COLOR SECTION CIRCUITRY/OBSERVING COLOR PATTERNS

LAP 06	1.	b
	2.	a
	3.	c
	4.	b
	5.	a
LAP 07	6.	b
	7.	d
	8.	c
	9.	c
	10.	b

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Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Residual Magnetism

OBJECTIVE:

Describe typical symptoms commonly related to residual magnetism in a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly completing 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Need for Degaussing" LAP and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 15, Sections 15-1 through 15-3, in the above resource.
2. Answer the following review questions for Chapter 15: 13, 14, and 19.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Degaussing Procedure

OBJECTIVE:

Explain the procedure for degaussing a color television picture tube.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Need for Degaussing" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 20 in the response manual.
2. Complete the Practice Exercises for Lesson 20.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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77.04.07.09.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: RESIDUAL MAGNETISM/DEGAUSSING PROCEDURES

77.04.07.08.

1. What causes a T.V. screen to become impure?
   - a. aging of the set.
   - b. a poorly constructed T.V.
   - c. a magnetic field.
   - d. misadjustment.

2. What color should the screen be when adjusted for purity?
   - a. yellow.
   - b. green.
   - c. red.
   - d. blue.

3. When should a black and white T.V. be degaussed?
   - a. after installation.
   - b. when it becomes impure.
   - c. only when the picture tube is replaced.
   - d. it does not need degaussing.

4. What type of color T.V. does not require degaussing?
   - a. 19 inch and larger.
   - b. 25 inch only.
   - c. 14 inch and smaller.
   - d. all types require degaussing.

77.04.07.09.

5. When is the automatic degaussing circuit activated?
   - a. when the set has cooled off.
   - b. when the set is first turned on.
   - c. when the set is turned off.
   - d. while the set is on.

6. What device in a color T.V. becomes magnetized so as to cause an impure picture?
   - a. the phosphor dot.
   - b. the second anode.
   - c. the first anode.
   - d. the aperature mask.

7. How long should a degaussing coil be left on?

   a. as short as possible.
   b. 25 seconds or more.
   c. not more than 25 seconds.
   d. it doesn't matter.

LAP TEST ANSWER KEY: RESIDUAL MAGNETISM/DEGAUSSING PROCEDURES

LAP 08	1.	c
	2.	c
	3.	d
	4.	d
LAP 09	5.	b
	6.	d
	7.	a

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Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Diagnosing Need for Degaussing

OBJECTIVE:

Observe typical symptoms commonly related to residual magnetism in a color TV picture tube, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 20, Degaussing the Set.

Projector.

PROCEDURE:

1. View Film Loop 21 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Take the LAP test.

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Student: ____________________ File Code: 77.04.07.10.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: DIAGNOSING NEED FOR DEGAUSSING

1. Colors with white in them are called:

   a. base colors.
   b. desaturated colors.
   c. pastel colors.
   d. saturated colors.

2. What color should the screen be when adjusting purity?

   a. yellow.
   b. green.
   c. blue.
   d. red.

3. What type of color T.V. does not require degaussing?

   a. 14" and smaller.
   b. 19" and smaller.
   c. 25" only.
   d. all types require it.

4. When viewing a video signal with a scope, where is the color burst signal located?

   a. after the horizontal sync pulse.
   b. in the video information.
   c. before the horizontal sync pulse.
   d. in the sync-pulse.

5. How long should a degaussing coil be left on?

   a. as short a period of time as possible.
   b. less than 25 seconds.
   c. 25 seconds or more.
   d. any length of time.

6. What turns on the color killer circuit to enable it to pass color information?

   a. flyback pulse.
   b. A.C.C.
   c. 3.58 MHZ oscillator.
   d. color burst.

7. What color is developed when the basic colors of a T.V. set are mixed?

   a. blue.
   b. reddish yellow.
   c. white.
   d. black.

8. What would happen to the color if the color killer control was set too high?

   a. video loss.
   b. no affect on the color.
   c. no color.
   d. opens up the chroma circuit.

9. When should a T.V. be degaussed?

   a. when it needs it.
   b. every time it is turned on.
   c. only after installation.
   d. every six months.

10. What causes a purity problem in a color T.V. set?

   a. a poorly constructed set.
   b. a magnetic field.
   c. the aging of the T.V. set.
   d. a misadjustment.

LAP TEST ANSWER KEY: DIAGNOSING NEED FOR DEGAUSSING

1. b
2. d
3. d
4. a
5. a
6. c
7. c
8. c
9. a
10. b

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Degaussing the Set

OBJECTIVE:

Given a color TV set, degauss the picture tube.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.

TSD Trainer or television set
Degaussing coil
Mirror

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television set for possible degaussing.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Degauss the picture tube for the color television receiver.
5. Have the instructor evaluate the degaussing.
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.07.11.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: DEGAUSSING THE SET

1. What is incorporated in new T.V. sets to remove the effects of the earth's magnetic field on the purity of the screen?

   a. a single gun CRT.
   b. a non-magnetic picture tube.
   c. automatic degaussing circuit.
   d. slip-rings for purity.

2. At what distance should a coil be when degaussing a screen?

   a. 4 inches.
   b. one foot.
   c. 5 - 7 feet.
   d. 4 - 6 feet.

3. When should a T.V. be degaussed?

   a. only after installation.
   b. every time it is turned on.
   c. when it needs it.
   d. every six months.

LAP TEST ANSWER KEY: DEGAUSSING THE SET

1. c
2. a
3. c

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Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Adjusting Picture Tube Purity

OBJECTIVE:

Identify an impure screen and the television components in need of adjustment for obtaining purity.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Purity Adjustment Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 15, Section 15-4, on Pages 123 and 124, in the above resource.
2. Answer the following review question for Chapter 15: 7, 10, 13, 17 and 18.
3. Check answers with the answer key.
4. Proceed to the next LAP.

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Purity Setup

OBJECTIVE:

Describe the procedure for obtaining picture tube purity using the yoke assembly and purity rings.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Purity Adjustment Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 21 in the response manual.
2. Complete the Practice Exercises for Lesson 21.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Purity Adjustment Procedures

OBJECTIVE:

Observe symptoms related to an impure television screen, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 21, Purity Set-Up.

Projector.

PROCEDURE:

1. View Film Loop 21 indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.07.12.A2-2
77.04.07.13.A2-2
77.04.07.14.A2-2

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LAP TEST: ADJUSTING PICTURE TUBE PURITY/PURITY SETUP/ PURITY ADJUSTMENT PROCEDURES

77.04.07.12.

1. What device, found in a color T.V. chassis, is used to adjust purity?

   a. service switch.
   b. hi-voltage switch.
   c. raster switch.
   d. purity switch.

2. The purity rings of a color T.V. are located:

   a. on the convergence board.
   b. on the chassis.
   c. on the neck of the picture tube.
   d. on the yoke.

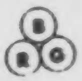
3. Which of the following devices is used in the purity adjustment to move the purity pattern on the screen?

   a. service switch.
   b. degaussing circuit.
   c. purity rings.
   d. centering rings.

4. What is placed in a color CRT to prevent the electron beam from striking other dots adjacent to it?

   a. yoke position control.
   b. purity rings.
   c. shadow mast.
   d. aquadaq.

5. Which of the following triads displays the proper dot placement as used in color T.V.s?



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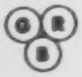

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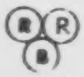

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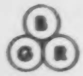

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77.04.07.13.

6. What must be absent to perform good purity adjustment?

   a. hi-voltage.
   b. the red gun.
   c. color.
   d. the video.

7. The aperature mask in a color CRT is constructed of:

   a. metal.
   b. glass.
   c. plastic.
   d. fiberglass.

77.04.07.14.

8. What would happen if the yoke is pushed up too far forward when making a purity adjustment?

   a. discoloration of the screen.
   b. picture distortion.
   c. nothing.
   d. fill out the screen.

9. Refer to figure #9 in the T.V. test pamphlet. Which number represents the purity rings?

   a. 2
   b. 4
   c. 3
   d. 1

10. What procedure should be followed before making a purity adjustment or set-up?

    a. turn the red screen down.
    b. degaussing.
    c. check the emission of the CRT.
    d. slide the yoke back.

77.04.07.12.A2-2
77.04.07.13.A2-2
77.04.07.14.A2-2

LAP TEST ANSWER KEY: ADJUSTING PICTURE TUBE PURITY/ PURITY SET UP/PURITY ADJUSTMENT PROCEDURES

LAP 12	1.	a
	2.	c
	3.	c
	4.	c
	5.	a
LAP 13	6.	d
	7.	a
LAP 14	8.	a
	9.	d
	10.	b

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Need for Purity Adjustment

OBJECTIVE:

Given a color TV set, diagnose the need for and procedures for purity setup.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet

TSD Trainer or television set
Hand tools
Degaussing coil
Mirror

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible purity adjustment.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Local the malfunction(s) and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Static Convergence

OBJECTIVE:

Describe typical symptoms commonly related to static convergence of a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Static Convergence Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 15, Section 15-6, in An Entry Into T.V. Servicing.
2. Answer review questions 8 and 16 for Chapter 15.
3. Check answers with the answer key.
4. Read Chapter 9, "The Color Picture Tube and Associated Circuits," in the Color-TV Training Manual.
5. Answer the questions at the end of the chapter.
6. Check the answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.07.15.A2-2

Date: ______________________ **Date Published:** 11/29/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: DIAGNOSING NEED FOR PURITY ADJUSTMENT

1. The aperature mask in a color CRT is made of:

   a. glass.
   b. plastic.
   c. metal.
   d. fiberglass.

2. What would happen if the yoke is pushed too far forward when making a purity adjustment?

   a. discoloration of the screen.
   b. fills out the screen.
   c. picture distortion.
   d. nothing.

3. By moving the blue magnet, which way will the green dot move?

   a. it won't move.
   b. vertically.
   c. up and down.
   d. horizontally.

4. What must be absent to perform good purity adjustment?

   a. red gun.
   b. hi-voltage.
   c. video.
   d. color.

5. What color should the screen be when doing a purity adjustment?

   a. black.
   b. green.
   c. red.
   d. blue.

6. The purity rings of a color T.V. are located:

   a. on the neck of the picture tube.
   b. on the yoke.
   c. on the convergence board.
   d. on the chassis.

7. Where are the static convergence controls located in a color T.V.?

   a. behind the yoke.
   b. on the chassis.
   c. on the yoke.
   d. in front of the yoke.

8. Which way does the red dot move when adjusting its magnets?

   a. up and down.
   b. parallel with the green.
   c. diagonally.
   d. horizontally.

9. What piece of test equipment is used to set the convergence on a color CRT?

   a. bar dot generator.
   b. color generator.
   c. R.F. generator.
   d. audio generator.

10. How many convergence magnets are used for static set-up in a color set?

   a. 2
   b. 4
   c. 3
   d. 1

LAP TEST ANSWER KEY: DIAGNOSING NEED FOR PURITY ADJUSTMENT

1. c
2. a
3. a
4. c
5. c
6. a
7. a
8. c
9. a
10. b

File Code: 77.04.07.17.A2-0

Date Published: 12/21/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Static Convergence Adjustments

OBJECTIVE:

Describe the procedure for static convergence using convergence magnets and a white dot pattern.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Static Convergence Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 22 in the response manual.
2. Complete the Practice Exercises for Lesson 22.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

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File Code: 77.04.07.18.A2-0

Date Published: 12/21/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Static Convergence Procedures

OBJECTIVE:

Observe symptoms related to static misconvergence of a color television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 22, Static Convergence.

Projector.

PROCEDURE:

1. View Film Loop 22 indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Diagnosing Need for Static Convergence

OBJECTIVE:

Given a color TV set, perform the process of static convergence.

EVALUATION PROCEDURE:

Correctly answer 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.

TSD Trainer or television set
Keyed rainbow/Bar-Dot generator
Mirror

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible misconvergence.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Perform the static convergence.
5. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.07.16.A2-2
77.04.07.17.A2-2
77.04.07.18.A2-2

Date: ______________________ Date Published: 11/29/77

Mountain-Plains Education &
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LAP TEST: STATIC CONVERGENCE, ADJUSTMENTS AND PROCEDURES

77.04.07.16.

1. The process of aiming the electron beams at the center of a color CRT screen is called:

   a. static convergence.
   b. dynamic convergence.
   c. focus.
   d. purity.

2. Which portion of a CRT screen does a static convergence primarily cover?

   a. the center.
   b. the entire screen.
   c. the outside edge.
   d. the bottom and top only.

77.04.07.17.

3. How many convergence magnets are used for static set up in a color set?

   a. 3
   b. 1
   c. 4
   d. 2

4. What should be checked both during and after a static convergence set-up in a color CRT?

   a. purity.
   b. hi-voltage.
   c. dynamic convergence.
   d. A.G.C. setting.

77.04.07.18.

5. Which way does the red dot move when adjusting its magnet?

   a. diagonally.
   b. up and down.
   c. parallel with the green.
   d. horizontally.

77.04.07.18. (continued)

6. Which way will the blue dot move when adjusting the blue dot magnet?

    a. horizontally.
    b. diagonally.
    c. vertically.
    d. parallel with the red and green.

7. What color will develop when red and green dots converge at the same point?

    a. blue.
    b. red.
    c. green.
    d. yellow.

8. By moving the blue magnet, which way will the green dot move?

    a. diagonally.
    b. vertically.
    c. horizontally.
    d. it won't move.

9. Which way will the green dot move when making a static set-up?

    a. parallel to the red dot.
    b. horizontally.
    c. diagonally.
    d. vertically.

10. What should usually be the last dot to be converged in a static set-up?

    a. blue.
    b. green.
    c. blue-green.
    d. red.

77.04.07.16.A2-2
77.04.07.17.A2-2
77.04.07.18.A2-2

LAP TEST ANSWER KEY: STATIC CONVERGENCE/ADJUSTMENTS/PROCEDURES

LAP	16	1.	a
		2.	a
LAP	17	3.	c
		4.	a
LAP	18	5.	a
		6.	c
		7.	d
		8.	d
		9.	c
		10.	a

Student: ____________________ **File Code:** 77.04.07.19.A2-2

Date: ____________________ **Date Published:** 11/29/77

Mountain-Plains Education &
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LAP TEST: DIAGNOSING NEED FOR STATIC CONVERGENCE

1. At what brightness level should a convergence be done?

   a. medium.
   b. low.
   c. with a red screen.
   d. high.

2. What piece of test equipment is used to set the convergence on a color CRT?

   a. color generator.
   b. B+K analyst.
   c. audio generator.
   d. bar dot generator.

3. Why is convergence necessary in a color T.V. set?

   a. to have the guns meet in the same place at the same time.
   b. to have the phosphor dots in the same place.
   c. to provide better focus.
   d. to provide better color.

4. What type of convergence is done for the outside part of the picture tube?

   a. dynamic.
   b. purity convergence.
   c. static.
   d. magnetic.

5. What type of convergence is set-up for the center of the screen in a color set?

   a. dynamic.
   b. magnetic.
   c. monochrome.
   d. static.

6. What color will develop when red and green dots converge at the same point?

   a. yellow.
   b. green.
   c. blue.
   d. red.

7. In doing a convergence set-up, what piece of test equipment is required?

   a. oscilloscope.
   b. a mirror.
   c. VOM.
   d. bar-dot generator.

8. What pattern is used to set-up static convergence on a color CRT?

   a. dots.
   b. cross-hatch.
   c. vertical lines.
   d. color.

9. For a convergence pattern, the generator is connected to the:

   a. purity rings.
   b. F. amps.
   c. antenna terminals.
   d. static magnets.

10. Which way will the blue dot move when adjusting the blue dot magnet?

   a. horizontally.
   b. vertical.
   c. parallel with the red and green.
   d. diagonally.

LAP TEST ANSWER KEY: DIAGNOSING NEED FOR STATIC CONVERGENCE

1. b
2. d
3. a
4. a
5. d
6. a
7. d
8. a
9. c
10. b

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Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Dynamic Convergence

OBJECTIVE:

Describe typical symptoms commonly related to dynamic convergence of a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Dynamic Convergence Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Section 15-7 in Chapter 15 in the above resource.
2. Answer review questions 9 and 20 for Chapter 15.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Dynamic Convergence Adjustments

OBJECTIVE:

Describe the procedure for dynamic convergence using the dynamic controls and a cross-hatch white pattern.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Dynamic Convergence Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 23 in the response manual.
2. Complete the Practice Exercises for Lesson 23.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Dynamic Convergence Procedures

OBJECTIVE:

Observe symptoms related to dynamic misconvergence of a color television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 23, Dynamic Convergence.

Projector.

PROCEDURE:

1. View Film Loop 23 and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________

Date: ______________________

File Code: 77.04.07.20.A2-2
77.04.07.21.A2-2
~~77.04.07.22.A2-2~~

Date Published: 11/29/77

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LAP TEST: DYNAMIC CONVERGENCE, ADJUSTMENTS AND PROCEDURES

77.04.07.20.

1. The process used to converge the outer part of the screen is called:

   a. purity.
   b. dynamic convergence.
   c. focus.
   d. static convergence.

77.04.07.21.

2. When the vertical red/green differential-tilt control is properly adjusted, it produces horizontal yellow lines at the:

   a. right center of the screen.
   b. bottom center of the screen.
   c. left center of the screen.
   d. top center of the screen.

3. When the vertical blue-amplitude control is properly adjusted, it produces horizontal white lines at the:

   a. top center of the screen.
   b. bottom center of the screen.
   c. right center of the screen.
   d. left center of the screen.

4. When the red/green vertical-amplitude control is properly adjusted, it produces vertical yellow lines at the:

   a. left center of the screen.
   b. bottom center of the screen.
   c. top center of the screen.
   d. right center of the screen.

5. When the red/green vertical-tilt control is properly adjusted, it produces vertical yellow lines at the:

   a. bottom center of the screen.
   b. right center of the screen.
   c. top center of the screen.
   d. left center of the screen.

77.04.07.21. (continued)

6. When the horizontal blue-tilt control is properly adjusted, it produces horizontal white lines at the:

   a. left center of the screen.
   b. top center of the screen.
   c. right center of the screen.
   d. bottom center of the screen.

7. When the red/green horizontal tilt control is properly adjusted, it produces vertical yellow lines at the:

   a. right center of the screen.
   b. left center of the screen.
   c. top center of the screen.
   d. bottom center of the screen.

8. When the vertical blue-tilt control is properly adjusted, it produces a horizontal white line at the:

   a. right center of the screen.
   b. left center of the screen.
   c. top center of the screen.
   d. bottom center of the screen.

77.04.07.22.

9. An instrument which may be used for dynamic convergence is a:

   a. cross-hatch generator.
   b. color-bar generator.
   c. oscilloscope.
   d. black and white test-pattern generator.

77.04.07.20.A2-2
77.04.07.21.A2-2
77.04.07.22.A2-2

LAP TEST ANSWER KEY: DYNAMIC CONVERGENCE, ADJUSTMENTS AND PROCEDURES

LAP 20	1.	b
LAP 21	2.	d
	3.	b
	4.	b
	5.	c
	6.	a
	7.	b
	8.	c
LAP 22	9.	a

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Date Published: 12/21/76

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Need for Dynamic Convergence

OBJECTIVE:

Given a color TV set, perform the procedure of dynamic convergence.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Alignment tool set
Hand tools
Keyed rainbow/Bar-Dot generator
TSD Trainer or television set

PROCEDURE.

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television receiver for possible misconvergence.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Perform the dynamic convergence.
5. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.07.23.A2-2

Date: ______________________ **Date Published:** 11/29/77

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LAP TEST: DIAGNOSING NEED FOR DYNAMIC CONVERGENCE

1. The dynamic convergence is usually done on the:

   a. outer portion of the screen.
   b. bottom portion of the screen.
   c. top portion of the screen.
   d. middle portion of the screen.

2. Where is the automatic degaussing coil located in a color set?

   a. around the yoke.
   b. around the bell of the CRT.
   c. under the chassis.
   d. around the neck.

3. Where are the controls located to perform a dynamic convergence?

   a. convergence panel.
   b. chassis.
   c. neck of the picture tube.
   d. yoke.

4. When the vertical blue-tilt control is properly adjusted, it will produce a horizontal white line at the:

   a. left center of the screen.
   b. bottom center of the screen.
   c. right center of the screen.
   d. top center of the screen.

5. Before performing a dynamic convergence, what should be checked?

   a. generator.
   b. purity.
   c. black and white picture.
   d. the static set-up.

6. Refer to figure #9 in the T.V. test pamphlet. Which number represents the dynamic convergence controls?

   a. 3
   b. 2
   c. 5
   d. not shown.

7. Is the service switch used in making a dynamic convergence adjustment?

   a. possibly.
   b. no.
   c. yes.
   d. occasionally.

8. How many controls are used in most T.V.s for dynamic convergence set-up?

   a. 12
   b. 10
   c. 2
   d. 4

9. The aperature mask in a color CRT is constructed of:

   a. plastic.
   b. glass.
   c. fiberglass.
   d. metal.

10. It may be necessary to repeat steps in the dynamic convergence procedure to achieve:

    a. the proper gray mode.
    b. less magnetic effects.
    c. brighter yellow lines.
    d. finer quality convergence.

LAP TEST ANSWER KEY: DIAGNOSING NEED FOR DYNAMIC CONVERGENCE

1. a
2. b
3. a
4. d
5. d
6. d
7. b
8. a
9. d
10. d

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Adjusting the Gray Scale

OBJECTIVE:

Describe typical symptoms commonly related to gray scale misadjustment of a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Procedures for Adjusting the Gray Scale" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 15, Section 15.5.
2. Answer review questions 4 and 5 for Chapter 15.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Gray Scale Controls

OBJECTIVE:

Describe the procedure for adjusting the color television screen controls to produce a gray scale.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Procedures for Adjusting the Gray Scale" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 24 in the response manual on Pages 153-154.
2. Complete the Practice Exercises for Lesson 24 on Pages 154-155.
3. Check answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson

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File Code: 77.04.07.26.A2-0

Date Published: 12/21/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Procedures for Adjusting the Gray Scale

OBJECTIVE:

Observe symptoms commonly related to gray scale misadjustments in color television sets, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 25, Gray Scale Adjustments.

Projector.

PROCEDURE:

1. View Film Loop 25 indicated in the resources and complete the film loop activities.
2. Check activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

77.04.07.24.A2-2
77.04.07.25.A2-2

Student: ______________ File Code: 77.04.07.26.A2-2

Date: ______________ Date Published: 11/29/77

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Glasgow AFB, Montana 59231

LAP TEST: ADJUSTING THE GRAY-SCALE/GRAY-SCALE CONTROLS/ PROCEDURES FOR ADJUSTING THE GRAY-SCALE

77.04.07.24.

1. The two methods used to set the gray scale can both be done:

   a. without looking at the screen.
   b. without using a service switch.
   c. with a service switch.
   d. by tuning to a strong color station.

2. An improper gray scale adjustment will affect:

   a. black and white pictures only.
   b. color pictures only.
   c. the sweep stability.
   d. both color and black and white pictures.

3. When setting up for the gray scale, the controls should first be placed:

   a. mid-range.
   b. in equal balance of each other.
   c. on full.
   d. in the off position.

4. What can be substituted for a service switch when setting up a gray scale?

   a. install a service switch.
   b. there is no substitute whatsoever.
   c. an unused channel.
   d. adjust the screen with the brightness control.

77.04.07.25.

5. What happens to the picture of a color T.V. set when the service switch is turned on?

   a. the screen turns red.
   b. the picture turns gray.
   c. the picture collapses to a white line.
   d. the screen goes blank.

77.04.07.25. (continued)

6. The gray scale adjustment is made using the:

    a. brightness control.
    b. drive controls.
    c. tint control.
    d. screen controls.

7. What controls are used to set up the B + W temperature settings or the gray scale?

    a. the triad intensity.
    b. the drive controls.
    c. the bias control.
    d. the screen controls.

8. When the gray scale is properly adjusted, the three electron guns:

    a. operate at their maximum output.
    b. have equal beam currents.
    c. are cut off.
    d. produce equal light output.

9. The gray scale adjustment can be checked by using the:

    a. brightness control.
    b. contrast control.
    c. hold controls.
    d. tint control.

77.04.07.26.

10. In setting up the gray scale, the usual color sequence used is:

    a. red, green, and blue.
    b. blue, red, and gray.
    c. gray, green, and red.
    d. blue, gray, and yellow.

77.04.07.24.A2-2
77.04.07.25.A2-2
77.04.07.26.A2-2

LAP TEST ANSWER KEY: ADJUSTING THE GRAY-SCALE/GRAY-SCALE CONTROLS/ PROCEDURES FOR ADJUSTING THE GRAY-SCALE

LAP 24	1.	c
	2.	d
	3.	d
	4.	c
LAP 25	5.	c
	6.	d
	7.	d
	8.	d
	9.	a
LAP 26	10.	a

File Code: 77.04.07.27.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Need for Adjusting the Gray Scale

OBJECTIVE:

Given a color TV set, perform the process for correctly setting the gray scale.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

TSD Trainer or television set
Keyed rainbow/Bar-Dot generator
Mirror

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible gray scale malfunction(s).
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Adjust the television for proper gray scale.
5. Take the LAP test.

Principal Author(s): P. Schuster, R. Arnason, B. Vetter

Student: ____________________ File Code: 77.04.07.27.A2-2

Date: ____________________ Date Published: 11/29/77

Mountain-Plains Education &
Economic Development
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Glasgow AFB, Montana 59231

LAP TEST: DIAGNOSING NEED FOR ADJUSTING THE GRAY SCALE

1. When the gray scale is properly adjusted, the three electron guns:

   a. have equal beam current.
   b. produce equal light output.
   c. are cut off.
   d. operate at their maximum output.

2. What can be substituted for a service switch when setting up a gray scale?

   a. adjust the screen with the brightness control.
   b. install a service switch.
   c. there is no substitution.
   d. an unused channel.

3. What controls are used to set up the black and white temperature settings for the gray scale?

   a. the screen controls.
   b. the bias control.
   c. the triad intensity.
   d. the drive controls.

4. Where are the screen controls located at in a color T.V. set?

   a. on the bottom of the chassis.
   b. in the front of the T.V.
   c. the back of the chassis.
   d. in front of the chassis.

5. In setting the gray scale, the service switch is put in the:

   a. normal position.
   b. set-up position.
   c. service position.
   d. raster position.

6. What happens to the picture of a color T.V. set when the service switch is turned on?

   a. the picture collapses to a white line.
   b. the screen goes blank.
   c. the screen turns red.
   d. the picture turns gray.

7. When setting up for the gray scale, the controls should be first placed:

   a. on full.
   b. in equal balance of each other.
   c. in the off position.
   d. mid-range.

8. What will happen to the picture if the gray scale is turned up too high?

   a. distorts.
   b. loses color.
   c. blooms.
   d. shorts the high voltage.

9. What will happen to the picture if the gray scale is turned up too high?

   a. creates a source of high voltage drain.
   b. loses color.
   c. blooms.
   d. distorts.

10. In setting up the gray scale, the usual color sequence is:

    a. blue, gray, yellow.
    b. red, green, blue.
    c. gray, green, red.
    d. blue, red, gray.

LAP TEST ANSWER KEY: DIAGNOSING NEED FOR ADJUSTING THE GRAY SCALE

1. b
2. d
3. a
4. c
5. c
6. a
7. c
8. c
9. c
10. b

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Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Color Television Setup

OBJECTIVE:

Describe the procedure for adjusting color television controls to perform a color television setup.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Color Setup Procedures" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Lesson 25 in the response manual.
2. Complete the Practice Exercises for Lesson 25.
3. Check your answers with the answer key.
4. Read Chapter 10, "Set-Up Procedure," in the Color-TV Training Manual.
5. Answer the questions at the end of Chapter 10.
6. Check your answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): B. Vetter

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File Code: 77.04.07.29.A2-0

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Color Setup Procedures

OBJECTIVE:

Given typical symptoms or conditions commonly related to typical setup procedures for a color television set, record comments and diagnosis along with suggested steps on a diagnosis sheet.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 26, Summary of Color Set Up.

Projector.

PROCEDURE:

1. View Film Loop 26 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ____________________ File Code: 77.04.07.28.A2-2
77.04.07.29.A2-2

Date: ____________________ Date Published: 11/29/77

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LAP TEST: COLOR TELEVISION SETUP AND PROCEDURES

77.04.07.28.

1. The process of removing residual magnetism from a T.V. is called:

   a. converging.
   b. degaussing.
   c. decoloring.
   d. purification.

2. Pure screen color is achieved by using:

   a. green and blue screen.
   b. red and green screen.
   c. all three basic colors.
   d. red screen only.

3. What adjustment should be made if the screen changes color when the brightness is varied?

   a. color purity.
   b. static convergence.
   c. the gray scale.
   d. dynamic convergence.

4. The objective of static convergence is to produce:

   a. white dots at the center of the screen.
   b. a white horizontal line at the center of the screen.
   c. an all-red screen.
   d. yellow lines at the edges of the screen.

5. Static convergence is achieved with:

   a. magnets around the neck of the picture tube.
   b. a degaussing coil.
   c. the convergence board.
   d. the screen color controls.

77.04.07.29.

6. The instrument used for static convergence is a:

   a. black and white test pattern.
   b. white-dot generator.
   c. tri-color generator.
   d. color-bar generator.

77.04.07.29. (continued)

7. The gray scale adjustment should be made:

   a. at the low brightness level.
   b. using a bar-dot generator.
   c. using the purity rings.
   d. whenever the screen is discolored.

8. When the set is adjusted to produce a pure screen color, the process is termed:

   a. gray scale adjustment.
   b. dynamic convergence.
   c. static convergence.
   d. purity set-up.

9. The dynamic convergence adjustment has the greatest effect:

   a. at the center of the screen.
   b. on the degaussing pattern.
   c. on the blue screen.
   d. at the edges of the picture.

10. The objective of dynamic convergence is to:

   a. produce a white screen.
   b. produce a red screen.
   c. produce white dots at the center of the screen.
   d. produce white vertical and horizontal lines over the entire screen.

77.04.07.28.A2-2
77.04.07.29.A2-2

LAP TEST ANSWER KEY: COLOR TELEVISION SET-UP AND PROCEDURES

LAP 28	1.	b
	2.	c
	3.	c
	4.	a
	5.	a
LAP 29	6.	b
	7.	a
	8.	d
	9.	d
	10.	d

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Performing Color Setup

OBJECTIVE:

Given a color TV set, perform a receiver setup.

EVALUATION PROCEDURE:

Correctly answer at least 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Alignment tool set
Hand tools
Degaussing coil
Keyed rainbow/Bar-Dot generator
Mirror
TSD Trainer or television set

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible color setup.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Perform the color setup.
5. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.07.30.A2-2

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LAP TEST: PERFORMING COLOR SETUP

1. What source should be used for reference in doing a dynamic convergence and a color set-up?

   a. a convergence manual.
   b. Sam's Photofact.
   c. personal experience.
   d. a T.V. text book.

2. When receiving a black and white transmission, the CRT of a color set should:

   a. produce colored snow.
   b. go blank due to a lack of color.
   c. produce different shades of gray.
   d. become dark gray in color.

3. What color will develop when red and green dots converge at the same spot?

   a. yellow.
   b. blue.
   c. red.
   d. green.

4. Which way will the blue dot move when adjusting the blue dot magnet?

   a. horizontally.
   b. diagonally.
   c. vertically.
   d. parallel with the red and green dots.

5. What pattern is used to do a static set-up?

   a. vertical lines.
   b. color.
   c. dots.
   d. cross-hatch.

6. How many magnets are used to control the red dot in a static set-up?

   a. 4
   b. 1
   c. [illegible]
   d. [illegible]

7. The process of removing residual magnetism from a T.V. is called:

   a. purification.
   b. convergence.
   c. desaturizing.
   d. degaussing.

8. An improper gray scale adjustment will affect:

   a. color picture only.
   b. black and white picture only.
   c. both color and black and white.
   d. the sweep stability.

9. How many convergence magnets are used for a static set-up in a color set?

   a. 2
   b. 4
   c. 3
   d. 1

10. The gray scale adjustment should be made:

    a. at the low brightness level.
    b. using purity rings.
    c. whenever the screen is discolored.
    d. using a bar-dot generator.

LAP TEST ANSWER KEY: PERFORMING COLOR SETUP

1. b
2. c
3. a
4. c
5. c
6. b
7. d
8. c
9. b
10. a

Student: ______________________ File Code: 77.04.07.00.B2-2

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UNIT POST TEST: INTRODUCTION TO COLOR TELEVISION

77.04.07.01.

1. A blue-green color is defined as:

    A. pastel.
    B. cyan.
    C. magenta.
    D. saturated.

2. What is the frequency of the color signal carrier being transmitted?

    A. 455 KC
    B. 15,750 KHZ
    C. 41.25 MHZ
    D. 3.58 MHZ

3. What color is developed when the basic colors of a T.V. circuitry are mixed?

    A. blue
    B. black
    C. white
    D. reddish yellow

4. What are the three basic colors used in color T.V. circuitry?

    A. green, blue, and magenta
    B. red, green, and blue
    C. blue, yellow, and red
    D. red, yellow, and green

5. Colors without any white in them are called:

    A. pastel colors.
    B. base colors.
    C. saturated colors.
    D. desaturated colors.

77.04.07.02.

6. What color results when red and green are mixed together on a T.V. screen?

    A. blue
    B. magenta
    C. yellow
    D. dark green

7. What activates the color circuitry in a color set?

   A. horizontal sync pulse
   B. the color burst signal
   C. the power supply
   D. A.G.C.

8. What color dots will the green gun of a color CRT activate?

   A. all colors
   B. red and green
   C. green only
   D. blue and green

77.04.07.03.

9. What color is obtained by mixing red and blue together?

   A. yellow
   B. cyan
   C. blue-black
   D. magenta

10. Another term used to describe the power of color on a CRT is:

    A. magenta.
    B. saturation.
    C. hue.
    D. brightness.

77.04.07.04.

11. Where do the R- Y, G- Y, and B- Y signals go when leaving the chroma section of a color T.V.?

    A. CRT
    B. flyback circuit
    C. 3.58 MHZ oscillator
    D. A.C.C.

12. When the color pulse leaves the bandpass amplifier, it then goes to the:

    A. A.C.C.
    B. A.G.C.
    C. horizontal sweep.
    D. demodulators

13. What would happen to the color if the color killer control was set too high?

    A. video loss
    B. no color
    C. opens up the chroma circuit
    D. no effect on the color

14. The main purpose of the color demodulator in a color T.V. is to:

    A. remove the black and white signal.
    B. provide a sync-pulse.
    C. remove the color signal from the black and white.
    D. keep the 3.58 MHZ oscillator on frequency.

15. What is another term used for the color section of a T.V.?

    A. color sync unit
    B. chroma section
    C. color amplifiers
    D. demodulator circuit

77.04.07.05.

16. What is another term used for color I.F. stages in a color T.V.?

    A. 3.58 MHZ oscillator
    B. demodulator
    C. chroma band pass
    D. color sync amp

17. Which stage of a color T.V. compares the color I.F. signal to the color oscillator in order to produce the R- Y, B- Y, G- Y signal?

    A. phase inverter
    B. burst amp
    C. color modulator
    D. demodulator circuit

18. What turns on the color killer circuit to enable it to pass color information?

    A. 3.58 MHZ oscillator
    B. A.C.C.
    C. flyback pulse
    D. color burst

19. What part of the chroma section controls the gain of the color intensity?

    A. color killer
    B. A.C.C.
    C. burst amp
    D. A.G.C.

20. Before a color T.V. is able to tune-in a good color picture, it must:

    A. have a good station transmitting color.
    B. have a good picture tube.
    C. be a good make of T.V.
    D. have a good black and white picture.

77.04.07.06.

21. What is wrong with figure #7 in the T.V. test pamphlet?

    A. too much red
    B. too much green
    C. not enough blue
    D. 60 HZ hum bar

22. Referring to figure #1 of the T.V. test pamphlet, what is the problem with this picture of the color bars?

    A. inadequate amount of green
    B. nothing
    C. too much blue
    D. not enough red

23. What is wrong with figure #6 in the T.V. test pamphlet?

    A. too much red
    B. 60 HZ hum bar
    C. no blue
    D. too much green

24. What would cause a picture on a color T.V. screen to look like figure #4 in the T.V. test pamphlet?

    A. misadjusted horizontal hold
    B. vertical hold not adjusted properly
    C. A.C.C. set too high
    D. 3.58 MHZ oscillator off frequency

25. Refer to figure #5 in the T.V. test pamphlet. What section should be checked for probable cause?

    A. burst amp
    B. R- Y amp
    C. N- Y amp
    D. G- Y amp

77.04.07.07.

26. What should be the first step in degaussing a T.V. screen?

    A. check purity
    B. check the high voltage
    C. check convergence
    D. unplug the T.V.

27. When should a black and white T.V. be degaussed?

    A. after installation
    B. only when the picture tube is replaced
    C. when it becomes impure
    D. it does not need degaussing

28. What causes a T.V. screen to become impure?

    A. a magnetic field
    B. a poorly constructed T.V.
    C. aging of the set
    D. misadjustment

29. What color should the screen be when adjusted for purity?

    A. red
    B. blue
    C. yellow
    D. green

30. What type of color T.V. does not require degaussing?

    A. those with trinatron picture tubes
    B. solid state
    C. all types require degaussing
    D. those with picture tubes smaller than 19" in diameter

77.04.07.08.

31. How large in diameter is the average degaussing coil?

    A. 13 - 15 inches
    B. 5 inches
    C. 10 - 12 inches
    D. 6 - 7 inches

32. How long should a degaussing coil be left on?

    A. as short as possible
    B. it doesn't matter
    C. not more than 25 seconds
    D. 25 seconds or more

77.04.07.09.

33. When should a T.V. be degaussed?

    A. every time it is turned on
    B. when it needs it
    C. only after installation
    D. every six months

34. What is incorporated in new T.V. sets to remove the effects of the earths magnetic field on the purity of the screen?

    A. a non-magnetic picture tube
    B. a single gun CRT
    C. automatic degaussing circuit
    D. slip-rings for purity

35. What is the last step in degaussing a T.V. before unplugging the coil?

A. move the coil over the degauss the sides and bottom
B. back up from the screen
C. turn the edge of the coil towards the screen
D. rotate the coil away from the screen

77.04.07.10.

36. When viewing a video signal with a scope, where is the color burst signal located?

A. in the video information
B. after the horizontal sync pulse
C. before the horizontal sync pulse
D. in the sync-pulse

37. What color is developed when the basic colors of a color T.V. set are mixed?

A. reddish yellow
B. blue
C. black
D. white

38. What device in a color CRT becomes magnetized so as to cause a purity problem?

A. the second anode
B. the first anode
C. the aperature mask
D. the phosphor dot

39. Colors with white in them are called:

A. desaturated colors.
B. saturated colors.
C. pastel colors.
D. base colors.

40. What would happen to the color if the color killer control was set too high?

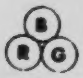
A. video loss
B. no color
C. no effect on the color
D. opens up the chroma circuit

77.04.07.11.

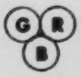
41. What is placed in a color CRT to prevent the electron beam from striking other dots adjacent to it?

    A. yoke position control
    B. shadow mask
    C. aquadag
    D. purity rings

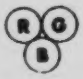
42. Which of the following triads displays the proper dot placement as used in color T.V.s?



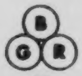
A



B



C



D

43. The purity rings of a color T.V. are located:

    A. on the convergence board.
    B. on the yoke.
    C. on the chassis.
    D. on the neck of the picture tube.

44. What material is used to coat the inside of a color CRT screen?

    A. phosphor
    B. light-emitting diodes
    C. bacteria
    D. photo-electric cells

45. What device, found in a color T.V. chassis, is used to adjust purity?

    A. raster switch
    B. degausser switch
    C. high-voltage switch
    D. service switch

77.04.07.12.

46. What must be absent to perform good purity adjustment?

    A. the video
    B. hi-voltage
    C. color
    D. the red gun

47. What is done to obtain a red purity pattern in the middle of the screen?

    A. The service switch is used
    B. The purity rings are adjusted.
    C. The yoke is slid back.
    D. The color killer is turned up.

48. The aperature mask in a color CRT is constructed of:

A. plastic.
B. glass.
C. metal.
D. fiberglass.

77.04.07.13.

49. What would happen if the yoke is pushed up too far forward when making a purity adjustment?

A. fill out the screen
B. nothing
C. picture distortion
D. discoloration of the screen

50. What procedure should be followed before making a purity adjustment or set-up?

A. turn the red screen off
B. check the emission of the CRT
C. slide the yoke back
D. degaussing

77.04.07.14.

51. Where are the static convergence controls located in a color T.V.?

A. on the chassis
B. on the yoke
C. behind the yoke
D. in front of the yoke

52. What would happen if the yoke is pushed too far forward when making a purity adjustment?

A. discoloration of the screen
B. picture distortion
C. nothing
D. fills out the screen

53. The aperature mask in a color CRT is made of:

A. glass.
B. metal.
C. plastic.
D. fiberglass.

54. The purity rings of a color T.V. are located:

A. on the yoke.
B. on the neck of the picture tube.
C. on the convergence board.
D. on the chassis.

55. Which way does the red dot move when adjusting its magnets?

A. diagonally
B. up and down
C. horizontally
D. parallel with the green

77.04.07.15.

56. The process of aiming the electron beams at the center of a color CRT screen is called :

A. purity.
B. static convergence.
C. focus.
D. dynamic convergence.

57. What piece of test equipment is used to set the convergence on a color CRT?

A. bar-dot generator
B. R.F. generator
C. color generator
D. audio generator

58. Which portion of a CRT screen does a static convergence primarily cover?

A. the center
B. the entire screen
C. the bottom and top only
D. the outside edge

77.04.07.16.

59. What pattern is used to set-up static convergence on a color CRT?

A. cross-hatch
B. dots
C. color
D. vertical lines

60. What should be checked both during and after a static convergence set-up in a color CRT?

A. hi-voltage
B. A.G.C. setting
C. dynamic convergence
D. purity

77.04.07.17.

61. Which way will the blue dot move when adjusting the blue dot magnet?

A. diagonally
B. parallel with the red and green
C. horizontally
D. vertically

62. Which way does the red dot move when adjusting its magnet?

A. horizontally
B. diagonally
C. parallel with the green
D. up and down

63. What should usually be the last dot to be converged in a static set-up?

A. blue-green
B. blue
C. green
D. red

64. What color will develop when red and green dots converge at the same point?

A. blue
B. red
C. green
D. yellow

65. By moving the blue magnet, you can make the green dot move:

A. vertically.
B. the green dot won't move.
C. horizontally.
D. diagonally.

77.04.07.18.

66. For a convergence pattern, the generator is connected to the:

A. antenna terminals.
B. F. amps.
C. static magnets.
D. purity rings.

67. What pattern is used to set up static convergence on a color CRT?

A. color
B. vertical lines
C. dots
D. cross-hatch

68. What type of convergence is set up for the center of the screen in a color set?

A. monochrome
B. magnetic
C. dynamic
D. static

69. What color will develop when red and green dots converge at the same point?

A. red
B. yellow
C. green
D. blue

70. Which way will the blue dot move when adjusting the blue dot magnet?

A. diagonally
B. horizontally
C. parallel with the red and green
D. vertical

77.04.07.19.

71. To what source should one go in order to learn the best procedure for doing a dynamic convergence on a color CRT?

A. Sams' Photofact
B. a convergence manual
C. personal experience
D. a T.V. text book

77.04.07.20.

72. When the vertical blue-amplitude control is properly adjusted, it produces horizontal white lines at the:

A. bottom center of the screen.
B. top center of the screen.
C. left center of the screen.
D. right center of the screen.

73. When the vertical red/green differential-tilt control is properly adjusted, it produces horizontal yellow lines at the:

A. top center of the screen.
B. left center of the screen.
C. right center of the screen.
D. bottom center of the screen.

74. When the red/green horizontal tilt control is properly adjusted, it produces vertical yellow lines at the:

A. right center of the screen.
B. top center of the screen.
C. bottom center of the screen.
D. left center of the screen.

77.04.07.21.

75. It may be necessary to repeat steps in the dynamic-convergence procedure to achieve:

A. brighter yellow lines.
B. proper gray scale.
C. freedom from magnetic effects.
D. finer quality convergence.

77.04.07.22.

76. Where is the automatic degaussing coil located in a color set?

A. around the neck
B. around the yoke
C. around the bell of the CRT
D. under the chassis

77. Will readjusting the purity set-up affect the convergence settings?

A. only on black and white sets
B. only on color sets
C. yes, on all sets
D. no

78. Is the service switch used in making a dynamic convergence adjustment?

A. no
B. possibly, depending on the make and model set
C. only on color sets
D. yes, at all times

79. What color should the screen be when making convergence adjustments?

A. red
B. blue
C. green
D. gray

80. Before performing a dynamic convergence, what should be checked?

A. purity
B. black and white picture
C. generator
D. the static set-up

77.04.07.23.

81. The most common method used to set the gray scale can be done:

A. without using a service switch.
B. by tuning to a strong color station.
C. without looking at the screen.
D. with a service switch.

82. When receiving a black and white transmission, the CRT of a color set should:

A. produce various shades of gray.
B. become dark gray in color.
C. go blank, because of a lack of color.
D. produce color snow.

83. What can be substituted for a service switch when setting up a gray scale?

A. adjust the screen with the brightness control
B. there is no substitute whatsoever
C. an unused channel
D. install a service switch

84. When using the service switch method of adjusting the gray scale, one should look for:

A. a gray screen
B. white lines across the screen
C. a blue screen
D. colored lines across the screen

85. The two methods used to set the gray scale can both be done:

A. by using the degausser.
B. by tuning to a color program.
C. without looking at the screen.
D. with a service switch.

77.04.07.24.

86. The gray scale adjustment can be checked by using the:

A. contrast control.
B. brightness control.
C. hold controls.
D. tint control.

87. When the gray scale is properly adjusted, the three electron guns:

A. are cut off.
B. operate at their maximum output.
C. have equal beam currents.
D. produce equal light output.

88. The gray scale adjustment is made using the:

A. brightness control.
B. drive controls.
C. tint control.
D. screen controls.

89. What controls are used to set up the black and white temperature settings or the gray scale?

A. the bias control
B. the drive control
C. the triad intensity
D. the screen controls

77.04.07.25.

90. After varying the brightness in checking the gray scale, what is looked for on the screen?

A. shadows
B. a color change
C. flesh tones
D. white dots or a crosshatch pattern

77.04.07.26.

91. In setting the gray scale, the service switch is put in the:

A. raster position.
B. normal position.
C. service position.
D. set-up position.

92. In setting up the gray scale, the usual color sequence used is:

A. blue, gray, yellow.
B. blue, red, gray.
C. gray, green, red.
D. red, green, blue.

93. What happens to the picture of a color T.V. set when the service switch is turned on?

A. the screen turns red
B. the screen goes blank
C. the picture collapses to a white line
D. the picture turns gray

94. What will happen if the gray scale is turned up too high?

A. picture will bloom
B. it will short the hi-voltage
C. the picture will lose color
D. the picture will be distorted

95. When setting up for the gray scale, the controls should be first placed:

A. in the off position.
B. mid-range.
C. on full.
D. in equal balance of each other.

77.04.07.27.

96. The three basic colors used in T.V. sets are:

A. green, blue, and red.
B. magenta, blue and orange.
C. yellow, blue, and red.
D. red, green, and cyan.

97. What adjustment should be made if the screen changes color when the brightness is varied?

A. the gray scale
B. color purity
C. static convergence
D. dynamic convergence

98. Why is a good set-up necessary in color T.V. repair?

A. to get a good color and black and white picture
B. to obtain a high level of purity
C. for good customer relations
D. to get a good gray scale

99. Pure screen color is achieved by using:

A. red and green screen.
B. green and blue screen.
C. all three basic colors.
D. red screen only.

100. The process of removing residual magnetism from a T.V. is called:

A. purification.
B. degaussing.
C. converging.
D. decoloring.

77.04.07.28.

101. The gray scale adjustment should be made:

A. whenever the screen is discolored.
B. at the low brightness level.
C. using the purity rings.
D. using a bar-dot generator.

102. Static convergence is achieved with:

A. magnets around the neck of the picture tube.
B. the screen color controls.
C. the convergence board.
D. a degaussing coil.

103. The objective of dynamic convergence is to:

A. produce a white screen.
B. produce a red screen.
C. produce white dots at the center of the screen.
D. produce white vertical and horizontal lines over the entire screen.

104. When the set is adjusted to produce a pure screen color, the process is termed:

A. static convergence.
B. purity set-up.
C. gray scale adjustment.
D. dynamic convergence.

105. The dynamic convergence adjustment has the greatest effect:

A. at the center of the screen.
B. at the edges of the picture.
C. on the blue screen.
D. on the degaussing pattern.

77.04.07.29.

106. What pattern is used to do a static set-up?

    A. dots
    B. color
    C. cross-hatch
    D. vertical lines

107. Which way will the green dot move when making a static set-up?

    A. diagonally
    B. vertically
    C. horizontally
    D. parallel to the red dot

108. Which way will the blue dot move when adjusting the blue dot magnet?

    A. diagonally
    B. parallel with the red and green dots
    C. vertically
    D. horizontally

109. What color will develop when red and green dots converge at the same spot?

    A. red
    B. blue
    C. green
    D. yellow

110. The objective of static convergence is to produce:

    A. an all-red screen.
    B. a white horizontal line in the center of the screen.
    C. white lines at the edge of the screen.
    D. white dots at the center of the screen.

UNIT POST TEST ANSWER KEY: INTRODUCTION TO COLOR TELEVISION

LAP 01.	1.	B
	2.	D
	3.	C
	4.	B
	5.	C
LAP 02	6.	C
	7.	B
	8.	C
LAP 03	9.	D
	10.	D
LAP 04	11.	A
	12.	D
	13.	B
	14.	A
	15.	B
LAP 05	16.	C
	17.	D
	18.	D
	19.	B
	20.	D
LAP 06	21.	B
	22.	B
	23.	A
	24,	A
	25.	B
LAP 07	26.	B
	27.	D
	28.	A
	29.	A
	30.	C
LAP 08	31.	C
	32.	A
LAP 09	33.	B
	34.	C
	35.	C
LAP 10	36.	B
	37.	D
	38.	C
	39.	A
	40.	B
LAP 11	41.	B
	42.	C
	43.	D
	44.	A
	45.	D
LAP 12	46.	A
	47.	C
	48.	C
LAP 13	49.	D
	50.	D
LAP 14	51.	C
	52.	A
	53.	B
	54.	B
	55.	A
LAP 15	56.	B
	57.	A
	58.	A
LAP 16	59.	B
	60.	D
LAP 17	61.	D
	62.	B
	63.	B
	64.	D
	65.	B
LAP 18	66.	A
	67.	C
	68.	D
	69.	B
	70.	D
LAP 19	71.	A
LAP 20	72.	A
	73.	A
	74.	D
LAP 21	75.	D
LAP 22	76.	C
	77.	D
	78.	A

UNIT POST TEST ANSWER KEY: INTRODUCTION TO COLOR TELEVISION

LAP 22 cont.		
	79.	D
	80.	D
LAP 23	81.	D
	82.	A
	83.	C
	84.	D
	85.	D
LAP 24	86.	B
	87.	D
	88.	D
	89.	D
LAP 25	90.	B
LAP 26	91.	C
	92.	D
	93.	C
	94.	A
	95.	A
LAP 27	96.	A
	97.	A
	98.	A
	99.	C
	100.	B
LAP 28	101.	B
	102.	A
	103.	D
	104.	B
	105.	B
LAP 29	106.	A
	107.	A
	108.	C
	109.	D
	110.	D

Student: ______________________ File Code: 77.04.07.00.A1-5

Date: ______________________ Date Published: 11/25/75

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Family Pay Number: __________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: INTRODUCTION TO COLOR TELEVISION

OBJECTIVE 1:

The student will diagnose malfunctions with regard to color television set up.

OBJECTIVE 2:

The student will do whatever is required to adjust the malfunction in the color television set-up.

The term "color set-up" refers to the following:

1. Static convergence adjustment
2. Dynamic convergence adjustment
3. Purity adjustment
4. Gray scale adjustment

TASK:

The student wil be given a trainer or color television set that has one or more of the following defects:

1. Poor convergence
2. Poor purity
3. Poor gray scale

The student will then be expected to diagnose and adjust the defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, B & K television analyst, hand tools, mirror, deguassing coil, bar-dot generator and high-voltage probe.

Page 3

Student: ______________________ **File Code:** 77.04.07.00.A1-5

Date: ______________________ **Date Published:** 11-14-74

Family Pay Number: ______________ Sex: M F (Circle 1)

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PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose color setup failures.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. Uses the deguassing coil properly.		
Criterion: (Meets prescribed procedures in text, Entry		
Into Television Servicing, page 123.		
3. Uses the bar-dot generator.		
Criterion: (Meets procedures described in the manufacturer's		
specifications.)		
4. Properly adjust and sets purity.		
Criterion: Meets procedures described in text Entry		
into TV Servicing, page 123.		
5. Properly adjusts the gray scale.		
Criterion: Meets procedures in the text, Entry Into TV		

	CRITERION	
	Met	Not Met
Servicing, page 125.		
6. Properly adjusts static convergence.		
Criterion: (Meets procedures described in text, Entry		
Into Servicing, page 125.)		
7. Properly adjust dynamic convergence.		
Criterion: (Meets procedures described in the text,		
Entry Into TV Servicing, page 127.)		
8. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to		
problem.		
Student must meet criterion on all line items to obtain an over-		
all score of satisfactory.		

1.

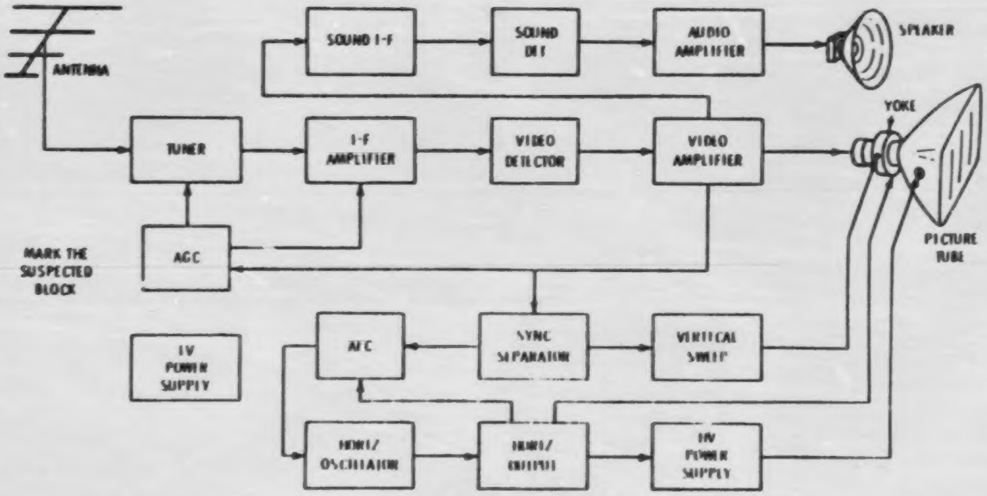
BLACK-AND-WHITE TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2.

OBSERVED SYMPTOMS		
SOUND	**VIDEO**	**RASTER**
DIAGNOSIS (suspected block) and comments:		

3.


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
YOKE
PICTURE TUBE
AGC
TV POWER SUPPLY
AFC
SYNC SEPARATION
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

MARK THE SUSPECTED BLOCK

CORRECTIVE ACTION (suggested or taken):	

When your diagnosis is complete, continue with the remainder of the lesson.

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

checks purity
checks for mis-convergence
checks the gray scale

File Code: 77.04.08.00.A2-1

Date Published: 12/23/76

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Learning Experience Guide

UNIT: TELEVISION COLOR SECTION TROUBLES

RATIONALE:

A television repair person is required to troubleshoot and repair the chroma section of a television receiver. To effectively do this, the repair person needs to know about normal operation of color circuits. This includes the effect these circuits have on each other and the monochrome sections of the receiver. The repair person needs to recognize symptoms of chroma section problems, isolate their cause and correct them.

PREREQUISITES:

Unit: 07.04.07. introduction to Color Television

OBJECTIVE:

Students will recognize symptoms of trouble; diagnose difficulties; make necessary adjustments; remove, repair and replace components for the chroma section of the television receiver using tools and equipment.

RESOURCES:

Printed Materials

Color Television Diagnosis Sheets.
Instruction Manual for 1077 Television Analyst. B & K Division of Dynascan Corporation, 1968.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Color-TV Training Manual. Howard W. Sams Editorial Staff, Howard W. Sams and Company, Inc., 1974.

Audio/Visuals

Super 8 Sound Film:

Television Symptom Diagnosis TSD-133. (Film Loop Nos. 27, 28, 29, 30, 31 and 32), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

Principal Author(s): L. Leland, B. Vetter

RESOURCES: (continued)

Equipment

Alignment tool set
Cathode ray tube checker
Capacitor checker
Color T.V.
Desoldering tools
Soldering iron
Keyed rainbow/Bar-Dot generator
Service Master 99SM Kit, or equivalent; Xcelite 99SM Kit, Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Vacuum tube volt meter
Volt-ohm meter
Oscilloscope
Super 8 Sound Film Projector, Model 60, Hickok Teaching Systems, Inc.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 West Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis, KT-185Y, Hickok Teaching Systems, Inc.
Soldering tools
Transistor F.E.T. checker
Vacuum tube checker

GENERAL INSTRUCTIONS:

This unit consists of 25 Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) In this unit, there are some LAPs that have tests combined with other LAP tests. These combined tests are taken after completing the last LAP covered by the test.
(9) Take the unit tests as described in the Unit LEG "Evaluation Procedures."
(10) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Color Symptom Categories
.02 Television Color Section Troubles
.03 Identifying Color Section Blocks
.04 Symptoms of Color Section Failures
.05 Chroma Circuits
.06 Diagnosing Chroma Section Troubles
.07 Diagnosing Color Section Failures
.08 Troubleshooting Color Problems
.09 Color Demodulation
.10 Loss of One Color
.11 Symptoms of Loss of One Color
.12 Diagnosing Loss of One Color
.13 Conditions Causing Loss of Color
.14 Loss of Color
.15 Symptoms of No Color
.16 Troubleshooting the Color Receiver
.17 Diagnosing Loss of Color
.18 Conditions Causing One Excessive Color
.19 One Excessive Color
.20 Symptoms of One Excessive Color
.21 Diagnosing One Excessive Color
.22 No Color Sync
.23 Symptoms of No Color Sync
.24 Diagnosing No Color Sync
.25 Aligning the Color Receiver

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was satisfactorily completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After reading this unit guide, go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

Apply knowledge and skills you have acquired in accomplishing the performance activities of this unit.

Student: ______________________ **File Code:** 77.04.08.00.A2-2

Date: ______________________ **Date Published:** 9-24-74

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UNIT PRETEST: TELEVISION COLOR SECTION TROUBLES

77.04.08.01.

1. How many colors make up a keyed rainbow pattern?

   A. 11
   B. 10
   C. 12
   D. 13

2. Refer to figure #13 in the T.V. Test Pamphlet. What is wrong with the pattern depicted?

   A. too much blue
   B. no red
   C. out of phase
   D. no green

3. Refer to figure #2 in the T.V. Test Pamphlet. What section of the T.V. should be checked when this pattern occurs?

   A. sync-separator
   B. horizontal oscillator
   C. vertical oscillator
   D. color oscillator

4. What is the probable cause of the pattern displayed by figure #1 in the T.V. Test Pamphlet?

   A. not enough red
   B. an excessive amount of blue
   C. not enough color bars are displayed
   D. nothing, the pattern as displayed is normal

5. Refer to figure #14 in the T.V. Test Pamphlet. Which section of the T.V. should be checked when the screen appears like this?

   A. video
   B. color amp
   C. color demodulator
   D. picture tube

77.04.08.02.

6. Refer to figure #11 in the T.V. Test Pamphlet. What is wrong with this pattern?

   A. too much blue
   B. nothing
   C. not enough green
   D. no red

7. What is wrong with figure #12 in the T.V. Test Pamphlet?

A. not enough red
B. no red
C. too much blue
D. no green

8. What is wrong with the rainbow pattern as illustrated by figure #3 in the T.V. Test pamphlet?

A. too much green
B. no blue
C. too much red
D. out of phase

9. What symptom most accurately describes the pattern illustrated by figure #6 in the T.V. Test Pamphlet?

A. no green
B. no blue
C. too much red
D. out of sync

10. What is the problem with the T.V. picture as illustrated by figure #6 in the T.V. Test Pamphlet?

A. no gray
B. no blue
C. no green
D. too much red

77.04.08.03.

11. The color-sync signal received from a T.V. station is called:

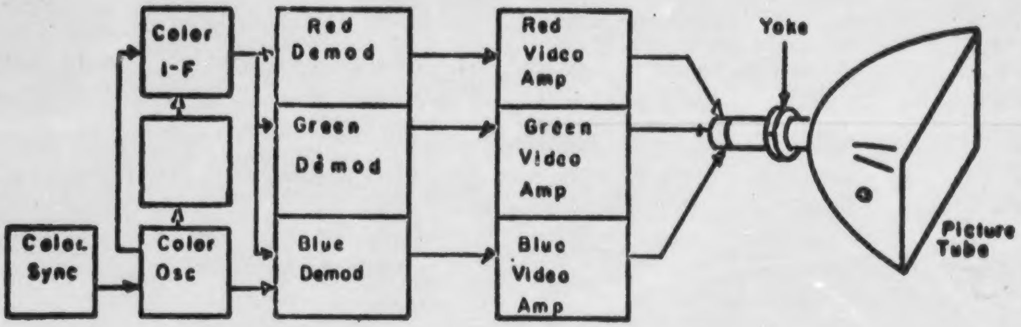
A. sync pulse.
B. chroma-sync pulse.
C. video carrier information.
D. color burst.

12. What section of a T.V. will cause a picture to appear like figure #4 in the T.V. Test Pamphlet?

A. horizontal oscillator
B. 3.58 mHz oscillator
C. sync separator
D. A.G.C.

13. What chroma section is missing from the block diagram provided below?

    A. burst amp
    B. NTSC amp
    C. A.C.C.
    D. color killer


Color I-F
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Color Sync
Color Osc
Yoke
Picture Tube

14. What is another term for a color I.F. amp?

    A. R- Y, G- Y, B- Y amp
    B. chroma-amp
    C. delayed video amp
    D. burst amp

15. Which section of the chroma acts like a switch and turns the color on and off?

    A. color killer
    B. chroma sync amp
    C. 3.58 mHz oscillator
    D. burst amp

77.04.08.04.

16. What is wrong with the pattern displayed by figure #1 in the T.V. Test Pamphlet?

    A. too much blue
    B. nothing
    C. too much red
    D. not enough blue

17. Refer to figure #15 in the T.V. Test Pamphlet. What section of a color T.V. set would display this picture if malfunctioning?

    A. color
    B. video output
    C. A.G.C.
    D. I.F. section

18. What is the problem with the test pattern of figure #7 in the T.V. Test Pamphlet?

    A. not enough red
    B. too much green
    C. not enough blue
    D. no cyan

19. What part of the color section will cause the problem as illustrated by figure #7 of the T.V. Test Pamphlet?

    A. color-demodulator
    B. burst amp
    C. 3.58 mHz oscillator
    D. A.C.C.

20. Referring to figure #3 in the T.V. Test Pamphlet, what is wrong with the test pattern depicted?

    A. no magenta
    B. excess red
    C. excess green
    D. no blue

77.04.08.05.

21. The color sync signal received from a T.V. station is called:

    A. chroma-sync pulse.
    B. color burst.
    C. video carrier information.
    D. sync pulse.

22. The four basic symptom categories for a color set are sound, video, color, and:

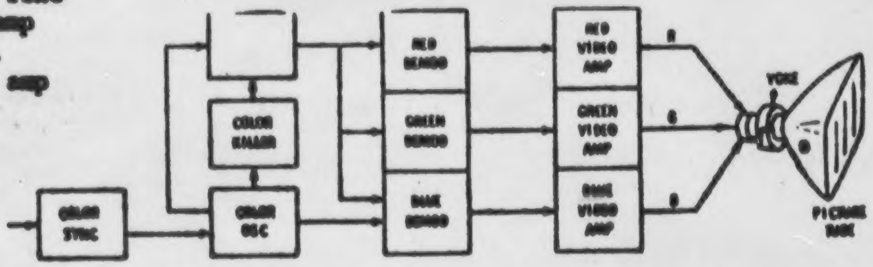
    A. CRT.
    B. sweep.
    C. signal.
    D. raster.

23. Where is the color generator output connection made to obtain a color pattern?

    A. the delay line
    B. the I.F. amp
    C. the video amp
    D. the antenna terminals

24. What section is missing from the block diagram below?

- A. delay line
- B. NTCS amp
- C. A.C.C.
- D. burst amp


RED DEMOD
GREEN DEMOD
BLUE DEMOD
COLOR KILLER
COLOR SYNC
COLOR OSC
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE

25. The color magenta in a test pattern is:

- A. greenish-yellow.
- B. reddish-yellow.
- C. bluish-red.
- D. blue-green.

77.04.08.06.

26. What section should be checked if a picture like figure #2 in the T.V. Test Pamphlet appears?

- A. horizontal oscillator
- B. color oscillator
- C. vertical oscillator
- D. sync-separator

27. What section should be checked if a picture looks like figure #14 in the T.V. Test Pamphlet?

- A. color demodulation
- B. color amp
- C. video
- D. picture tube

28. What is wrong with figure #7 in the T.V. Test Pamphlet?

- A. not enough blue
- B. too much green
- C. no cyan
- D. not enough red

29. To be able to use the color generator, a color T.V. must be on channel:

- A. 2 or 3
- B. 5 or 6
- C. 6 or 7
- D. 3 or 4

30. How many stages of color amplification are there in most T.V. sets?

A. 2
B. 1
C. 3
D. 4

77.04.08.07.

31. Which of the following adjustments have control over the amount of color displayed on the screen:

A. drive controls.
B. screen controls.
C. color intensity.
D. tint control.

32. Which section of a color T.V. set, if malfunctioning, will result in no color?

A. burst amp only
B. color killer only
C. all sections
D. A.C.C. only

33. What circuit in the chroma section will provide wrong colors to the screen by losing its sync?

A. horizontal oscillator
B. demodulator
C. burst amp
D. 3.58 mHz oscillator

34. Before a technician sets out to troubleshoot the chroma section of a color T.V., what should he do first?

A. check the sync separator
B. check the black and white picture
C. check the audio circuitry
D. examine the yoke

35. How many colors make up a NTCS color pattern?

A. 10
B. 9
C. 7
D. 3

77.04.08.08.

36. How can a CRT be checked to see if it is the cause of color loss?

A. look at the screen
B. CRT checker
C. rainbow generator
D. check the hi-voltage

77.04.08.09.

37. What is wrong with the test pattern displayed in figure #13 in the T.V. Test Pamphlet?

A. out of phases
B. not enough green
C. excess amount of blue
D. not enough red

38. Diagnose figure #11 in the T.V. Test Pamphlet:

A. it's normal.
B. not enough red.
C. not enough green.
D. too much blue.

39. What is wrong with figure #12 in the T.V. test pamphlet?

A. no green
B. excessive amount of green
C. excessive amount of red
D. excessive amount of blue

40. What is the problem with a T.V. that displays a screen like figure #5 in the T.V. Test Pamphlet?

A. too much green
B. too much blue
C. no red
D. no magenta

77.04.08.10.

41. What is wrong with figure #22 in the T.V. Test Pamphlet?

A. not enough red
B. it's normal
C. not enough green
D. excessive blue

42. How many colors make up a keyed rainbow pattern?

    A. 8
    B. 10
    C. 7
    D. 3

43. Where does the output of the color sync amp go in a color T.V. set?

    A. demodulator
    B. oscillator
    C. color killer
    D. color I.F.

44. Before a serviceman troubleshoots the chroma section, what should be checked first?

    A. sync separator
    B. the monochrome picture
    C. the audio circuitry
    D. the yoke

45. Where does the output of the color I.F. amp go in a color T.V. set?

    A. demodulator
    B. sync amp
    C. color killer
    D. oscillator

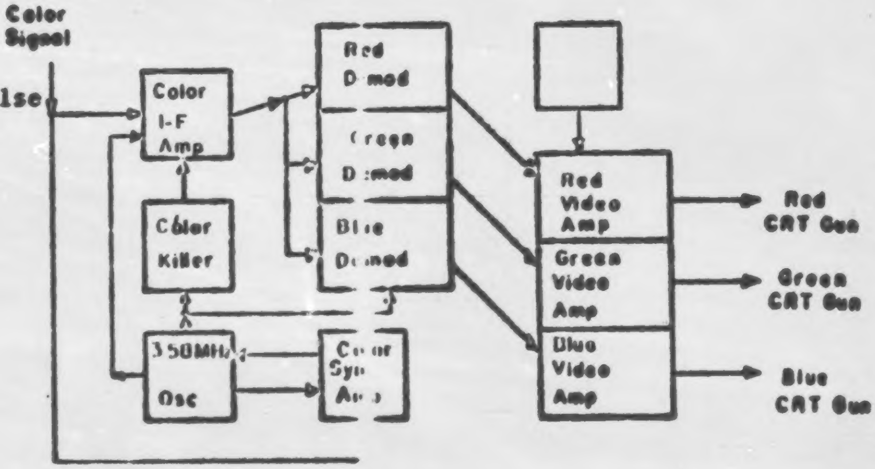
77.04.08.11.

46. The first step in checking a color T.V. with a no-color problem is to:

    A. check for sync pulse.
    B. check the tubes.
    C. check for color burst.
    D. check the demodulator.

47. What section is missing from this block diagram?

    A. A.G.C.
    B. audio
    C. video
    D. horizontal sync pulse


Color Signal
Color I-F Amp
Color Killer
3.58MHz Osc
Color Sync Amp
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Red CRT Gun
Green CRT Gun
Blue CRT Gun

48. Which circuit can cause a test pattern to look like figure #15 in the T.V. Test Pamphlet?

    A. A.G.C.
    B. picture tube
    C. color killer
    D. video I.F.

49. What circuit can malfunction and cause a color T.V. set to look like figure #15 in the T.V. Test Pamphlet?

    A. R.F. amp
    B. burst amp
    C. mixer
    D. picture tube

50. What section can cause a picture to look like figure #2 in the T.V. Test Pamphlet?

    A. horizontal hold
    B. burst amp
    C. demodulator
    D. oscillator

77.04.08.12.

51. Which of the following symptoms best describes the probable cause of the pattern shown in figure #2 in the T.V. Test Pamphlet?

    A. bad color I.F. amp
    B. no burst amp
    C. bad demodulator
    D. 3.58 mHz oscillator is off frequency

52. The test pattern in figure #6 in the T.V. Test Pamphlet shows:

    A. an excessive amount of red.
    B. no blue.
    C. no green.
    D. an excessive amount of green.

53. Refer to figure #1 in the T.V. Test Pamphlet. Which of the following symptoms best describes this test pattern?

    A. an excessive amount of green
    B. an excessive amount of blue
    C. a normal test pattern
    D. a lack of cyan

54. What is wrong with the test pattern displayed by figure #3 in the T.V. Test Pamphlet?

A. no magenta
B. an excessive amount of green
C. an excessive amount of red
D. no blue

55. Which of the following symptoms best describes the reason for the faulty test pattern shown in figure #4 of the T.V. Test Pamphlet?

A. malfunctioning sync separator
B. 3.58 mHz oscillator off frequency
C. bad A.C.C.
D. horizontal out of sync

77.04.08.13.

56. The first step in checking a color T.V. with a no color problem is to:

A. check the tubes.
B. check for color burst.
C. check for sync pulse.
D. check the demodulator.

57. What is wrong with figure #7 in the T.V. Test Pamphlet?

A. not enough blue
B. excessive green
C. not enough red
D. not enough yellow

58. What is wrong with the pattern depicted by figure #12 in the T.V. Test Pamphlet?

A. no magenta
B. too much blue
C. too much red
D. no green

59. What is wrong with figure #3 in the T.V. Test Pamphlet?

A. no blue
B. too much green
C. too much red
D. no magenta

60. What section will cause a pattern to look like figure #15 in the T.V. Test Pamphlet?

A. video I.F.
B. picture tube
C. A.G.C.
D. color killer

77.04.08.14.

61. What type of pattern is depicted by figure #11 in the T.V. Test Pamphlet?

A. NTCS
B. keyed rainbow
C. split phase
D. B + K analyst

62. What is wrong with figure #12 in the T.V. Test Pamphlet?

A. no red
B. excessive blue
C. no green
D. no cyan

63. What symptom most accurately describes the pattern illustrated by figure #11 in the T.V. Test Pamphlet?

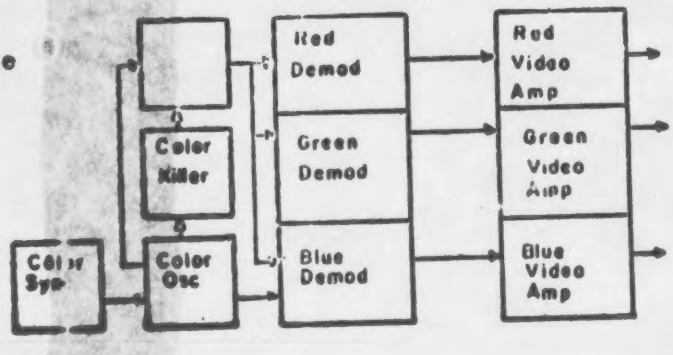
A. missing one color
B. out of sync
C. normal
D. missing two colors

64. What is wrong with a T.V. that displays a picture like figure #5 in the T.V. Test Pamphlet?

A. no red
B. excessive blue
C. no green
D. excessive green

65. What section is missing in the block diagram?

A. burst amp
B. A.G.C.
C. A.C.C.
D. horizontal sync pulse


Red Demod
Green Demod
Blue Demod
Color Killer
Color Syn
Color Osc
Red Video Amp
Green Video Amp
Blue Video Amp

77.04.08.15.

66. What is wrong with figure #13 in the T.V. Test Pamphlet?

    A. not enough red
    B. not enough green
    C. excessive blue
    D. not enough cyan

67. What is wrong with the test pattern depicted by figure #7 in the T.V. Test Pamphlet?

    A. not enough blue
    B. excessive green
    C. no red
    D. no cyan

68. What is wrong with figure #7 in the T.V. Test Pamphlet?

    A. no blue
    B. excessive green
    C. poor red
    D. no magenta

77.04.08.16.

69. Refer to figure #6 in the T.V. Test Pamphlet. What is wrong with this test pattern?

    A. no green
    B. no blue
    C. excessive red
    D. too much cyan

70. Which of the following symptoms most accurately describes the pattern illustrated by figure #6 in the T.V. Test Pamphlet?

    A. excessive red
    B. no blue
    C. no green
    D. no cyan

77.04.08.17.

71. If a television receiver has one excess color, what section may be checked with an oscilloscope to determine a malfunction?

    A. 3.58 mHz oscillator
    B. color killer
    C. A.C.C. stage
    D. color I.F. amp

72. What is wrong with the test pattern depicted in figure #7 in the T.V. Test Pamphlet?

A. too much green
B. not enough blue
C. not enough red
D. not enough yellow

73. What is wrong with the test pattern displayed by figure #12 in the T.V. Test Pamphlet.

A. no magenta
B. excessive blue
C. excessive red
D. no green

74. What is wrong with figure #13 in the T.V. Test Pamphlet?

A. not enough green
B. excessive blue
C. not enough red
D. not enough cyan

75. Which of the following symptoms most accurately describes the pattern illustrated by figure #6 in the T.V. Test Pamphlet?

A. no green
B. no blue
C. excessive red
D. no cyan

77.04.08.18.

76. In which section of a color T.V. are the screen controls located?

A. chroma video amp
B. demodulator
C. A.C.C.
D. purity rings

77. What controls the gain of the burst amp in the chroma section?

A. tint control
B. color intensity control
C. A.G.C.
D. A.C.C.

78. What is wrong with the test pattern displayed in figure #7 of the T.V. Test Pamphlet?

A. no yellow
B. no blue
C. poor red
D. excessive green

79. A raster with the wrong color over half of the screen is a symptom of:

A. misadjusted screen control.
B. bad CRT
C. incorrect purity
D. poor focus

80. What would cause peoples' faces to be purple on a color T.V. screen?

A. bad CRT
B. improperly aligned purity rings
C. misadjusted hue control
D. malfunctioning video amp

77.04.08.19.

81. What will cause a pattern to look like figure #4 in the T.V. Test Pamphlet?

A. sync separator
B. horizontal oscillator
C. A.G.C.
D. A.C.C.

82. What color is missing from the pattern depicted by figure #3 in the T.V. Test Pamphlet?

A. yellow
B. cyan
C. magenta
D. blue

83. What is the purpose of the 3.58 mHz color oscillator in the chroma section?

A. to sync with the demodulator
B. to "beat" with the horizontal sync pulse
C. to turn on the A.C.C.
D. to "beat" with the station burst

84. What is the most useful piece of test equipment for troubleshooting a solid-state chroma section?

A. V.O.M.
B. scope
C. V.T.V.M.
D. transistor checker

85. What is the problem with the pattern depicted by figure #16 in the T.V. Test Pamphlet?

A. two colors missing
B. excessive blue
C. nothing
D. one color missing

77.04.08.20.

86. What section will not give a loss of color sync in a color television:

A. color sync amp
B. reference oscillator
C. color I.F.
D. demodulator

87. What device is used in the 3.58 mHz oscillator to keep it exactly on frequency?

A. tunnel diode
B. transistor
C. crystal
D. LC network

88. What section of a color T.V. does the color sync amp feed its signal to?

A. color I.F. amp
B. color killer
C. 3.58 mHz
D. demodulators

89. Besides the color-sync amp causing loss of color sync, what other circuit might do so?

A. sync separator
B. phase lock
C. gating
D. flyback transformer

90. The output of the color I.F. goes where?

A. color killer
B. demodulator
C. 3.59 MHz oscillator
D. color sync amp

77.04.08.21.

91. What would cause a T.V. screen to appear like figure #2 in the T.V. test pamphlet?

A. vertical hold
B. A.G.C.
C. poor sync
D. color killer

92. What section failure will result in a picture like figure #16 in the T.V. Test Pamphlet?

A. video outputs
B. demodulator
C. color killer
D. color sync amp

93. Loss of color sync will look like:

A. loss of horizontal sync.
B. loss of vertical sync.
C. no color.
D. excessive color.

94. The output of the blue demodulator goes where?

A. red video amp
B. green video amp
C. blue video amp
D. color killer

95. The process of removing residual magnetism from a T.V. is called:

A. desaturizing.
B. purification.
C. convergence.
D. degaussing.

UNIT PRETEST: TELEVISION COLOR SECTION TROUBLES

LAP 01	1.	B
	2.	A
	3.	D
	4.	D
	5.	A
LAP 02	6.	B
	7.	D
	8.	B
	9.	C
	10.	D
LAP 03	11.	D
	12.	A
	13.	D
	14.	D
	15.	A
LAP 04	16.	B
	17.	A
	18.	B
	19.	C
	20.	D
LAP 05	21.	B
	22.	D
	23.	D
	24.	D
	25.	C
LAP 06	26.	B
	27.	C
	28.	B
	29.	D
	30.	A
LAP 07	31.	B
	32.	C
	33.	D
	34.	B
	35.	C
LAP 08	36.	B
LAP 09	37.	C
	38.	A
	39.	A
	40.	C
LAP 10	41.	B
	42.	B
	43.	B
	44.	B
	45.	A
LAP 11	46.	C
	47.	C
	48.	C
	49.	B
	50.	D
LAP 12	51.	D
	52.	A
	53.	C
	54.	D
	55.	D
LAP 13	56.	B
	57.	B
	58.	D
	59.	A
	60.	D
LAP 14	61.	B
	62.	C
	63.	C
	64.	A
	65.	A
LAP 15	66.	C
	67.	B
	68.	B

UNIT PRETEST: TELEVISION COLOR SECTION TROUBLES

LAP 16	69.	C
	70.	A
LAP 17	71.	D
	72.	A
	73.	D
	74.	B
	75.	C
LAP 18	76.	A
	77.	D
	78.	D
	79.	C
	80.	C
LAP 19	81.	B
	82.	D
	83.	D
	84.	B
	85.	D
LAP 20	86.	D
	87.	C
	88.	C
	89.	C
	90.	B
LAP 21	91.	C
	92.	C
	93.	A
	94.	C
	95.	D

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File Code: 77.04.08.01.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Color Symptom Categories

OBJECTIVE:

Describe the basic symptom categories into which all color television malfunctions are classified. Describe the characteristics of the RF and IF circuits in a color television receiver.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Color Section Troubles" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T. V. Servicing, Tinnell.

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Section 16-1 in An Entry Into T.V. Servicing.
2. Complete review questions 1-4 at the end of Chapter 16.
3. Check your answers with the answer key.
4. Read Chapter 4, "RF and IF Circuits," in the Color-TV Training Manual.
5. Answer the review questions at the end of Chapter 4.
6. Check answers with the answer key.
7. Proceed to the next LAP.

Principal Author(s): B. Vetter

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Television Color Section Troubles

OBJECTIVE:

Observe symptoms commonly related to typical malfunctions in the chroma section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 27, Identifying Color Symptoms.

Projector.

PROCEDURE:

1. View Film Loop 27 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.08.01.A2-2
77.04.08.02.A2-2

Date: ______________________ Date Published: 12/2/77

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LAP TEST: COLOR SYMPTOM CATEGORIES/TELEVISION COLOR SECTION TROUBLES

77.04.08.01.

1. Refer to figure #14 in the TV Test Pamphlet. Which section of the TV should be checked when the screen appears like this?

   a. video.
   b. color demodulator.
   c. picture tube.
   d. color amp.

2. Refer to figure #13 in the TV Test Pamphlet. What is wrong with the pattern depicted?

   a. no red.
   b. out of phase.
   c. no green.
   d. too much blur.

3. How many colors make up a keyed rainbow pattern?

   a. 11
   b. 10
   c. 13
   d. 12

4. Refer to figure #2 in the TV Test Pamphlet. What section of the TV should be checked when this pattern occurs?

   a. color oscillator.
   b. horizontal oscillator.
   c. sync separator.
   d. vertical oscillator.

5. What is the probable cause of the pattern displayed by figure #1 in the TV Test Pamphlet?

   a. nothing, the pattern as displayed is normal.
   b. an excessive amount of blue.
   c. not enough color bars are displayed.
   d. not enough red.

77.04.08.02.

6. What is the problem with the TV picture as illustrated by figure #6 in the TV Test Pamphlet?

   a. no green.
   b. too much red.
   c. no gray.
   d. no blue.

7. Which of the following symptoms best describes the pattern illustrated by figure #13 in the TV Test Pamphlet?

   a. no cyan.
   b. no red.
   c. too much blue.
   d. no green.

8. Refer to figure #11 in the TV Test Pamphlet. What is wrong with this pattern?

   a. not enough green.
   b. nothing.
   c. too much blue.
   d. no red.

9. What is wrong with figure #12 in the TV Test Pamphlet?

   a. not enough red.
   b. no green.
   c. no red.
   d. too much blue.

10. Refer to figure #12 in the TV Test Pamphlet. What is the problem with this TV picture?

   a. too much green.
   b. no magenta.
   c. no green.
   d. too much blur.

LAP TEST ANSWER KEY: COLOR SYMPTOM CATEGORIES/ TELEVISION COLOR TROUBLES

LAP .01

1. A
2. D
3. B
4. A
5. A

LAP .02

6. B
7. C
8. B
9. B
10. C

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Identifying Color Section Blocks

OBJECTIVE:

Given typical symptoms related to malfunctions in a color or B & W television, identify the circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Color Section Failure" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 27 in the response manual.
2. Complete the Practice Exercises for Lesson 27.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

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Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of Color Section Failures

OBJECTIVE:

Observe symptoms commonly related to typical malfunctions in the color section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 28, Block Diagram of a Color TV.

Projector.

PROCEDURE:

1. View Film Loop 28 indicated in the resources and complete the film loop activities.
2. Check the activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ File Code: 77.04.08.03.A2-2
77.04.08.04.A2-2

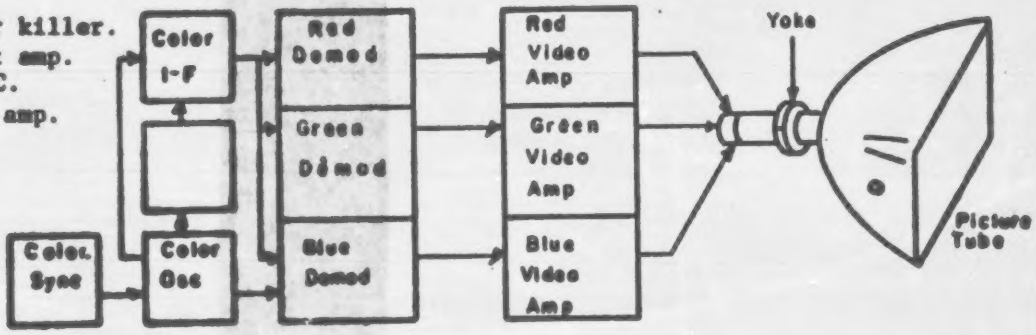
Date: ______________________ Date Published: 12/2/77

LAP TEST: IDENTIFYING COLOR SECTION BLOCKS/SYMPTOMS OF COLOR SECTION FAILURES

77.04.08.03.

1. What chroma section is missing from the block diagram provided below?

   a. color killer.
   b. burst amp.
   c. A.C.C.
   d. MTSC amp.


Color I-F
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Yoke
Picture Tube
Color Sync
Color Osc

2. How many stages of color amplification are there in most TV sets?

   a. 2
   b. 3
   c. 1
   d. 4

3. Which section of the chroma acts like a switch and turns the color on and off?

   a. burst amp.
   b. color killer.
   c. 3.58 MHZ oscillator.
   d. chroma sync amp.

4. What section of a TV will cause a picture to appear like figure #4 in the TV Test Pamphlet?

   a. sync separator.
   b. 3.58 MHZ oscillator.
   c. horizontal oscillator.
   d. A.G.C.

5. What is another term for a color I.F. amp?

   a. burst amp.
   b. delayed video amp.
   c. R- Y, G- Y, B- Y amp.
   d. chroma-amp.

77.04.08.04.

6. What is wrong with the test pattern depicted by figure #5 in the TV Test Pamphlet?

   a. excessive amount of blue.
   b. no red.
   c. no magenta.
   d. excessive amount of green.

7. Referring to figure #3 in the TV Test Pamphlet, what is wrong with the test pattern depicted?

   a. no magenta.
   b. excess green.
   c. no blue.
   d. excess red.

8. What is wrong with the pattern displayed by figure #1 in the TV Test Pamphlet?

   a. nothing.
   b. too much blue.
   c. not enough blue.
   d. too much red.

9. What is the problem with the test pattern of figure #7 in the TV Test Pamphlet?

   a. not enough red.
   b. too much green.
   c. not enough blue.
   d. no cyan.

10. Refer to figure #15 in the TV Test Pamphlet. What swction of a color TV set would display this picture if malfunctioning?

    a. I.F. section.
    b. color.
    c. video output.
    d. A.G.C.

LAP TEST ANSWER KEY: IDENTIFYING COLOR SECTION BLOCKS/ SYMPTOMS OF COLOR SECTION FAILURES

LAP .03

1. A
2. A
3. B
4. C
5. A

LAP .04

6. B
7. C
8. A
9. B
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Chroma Circuits

OBJECTIVE:

Describe circuit functions and characteristics of bandpass amplifiers, color-sync and color-killer circuits in a color receiver.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color-TV Training Manual by Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 6, "Bandpass-Amplifiers, Color-Sync and Color-Killer Circuits," in the Color-TV Training Manual.
2. Answer the questions at the end of Chapter 6.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter [illegible]

Student: ______________________ File Code: 77.04.08.05.A2-2

Date: ______________________ Date Published: 12/2/77

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LAP TEST: CHROMA CIRCUITS

1. C-W signals are generated and controlled by a section referred to as the ______________ of a color receiver.

   a. Q section.
   b. color sync.
   c. burst amp.
   d. luminance.

2. The ______________ is controlled by the color sync section and it affects the operation of the chrominance channel.

   a. burst amp.
   b. bandpass amp.
   c. color killer.
   d. I signal.

3. The purpose of the ______________ is to separate the chrominance signal from the composite color signal and supply it to the demodulators.

   a. bandpass amp.
   b. burst amp.
   c. 3.58 osc.
   d. color killer

4. The CRT is blanked out during the horizontal retrace time and the ______________ is effectively eliminated.

   a. color killer.
   b. 3.58 burst.
   c. bandpass amp.
   d. horizontal pulse.

5. In order to properly reproduce the colors of a televised image, the modulation of the chrominance subcarrier at the transmitter must be ______________ at the receiver.

   a. inverted.
   b. reversed.
   c. amplified.
   d. separated.

6. A composite color signal from the ______________ is applied to the burst amplifier stage.

   a. color killer.
   b. bandpass amp.
   c. video I-F.
   d. burst take off.

7. The polarity of the color burst is ______________ through the burst amp; therefore, the signal at the grid of this tube will be 180 degrees out of phase with the plate.

   a. inverted.
   b. reversed.
   c. amplified.
   d. cut off.

8. The hue control functions as a ______________ and its setting will determine the phase angle of the color burst at the grid of the burst amplifier.

   a. cut off point.
   b. vernier.
   c. amplifier.
   d. diode.

9. The purpose of the ______________ in a receiver is to prevent any signal from getting through the chrominance channel during a B&W signal.

   a. burst amp.
   b. bandpass amp.
   c. color killer.
   d. 3.58 osc.

10. A ______________ is provided to permit adjustment of the level at which a color killer begins conduction.

   a. tube.
   b. killer threshold.
   c. transformer.
   d. A.C.C.

LAP TEST ANSWER KEY: CHROMA CIRCUITS

1. B
2. C
3. A
4. B
5. B
6. D
7. A
8. B
9. C
10. B

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Chroma Section Troubles

OBJECTIVE:

Given a television set with malfunctions commonly found in the chroma section of a color television, diagnose and record comments on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Color Section Failures" LAP test and is taken _after_ completing that LAP.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Instruction Manual for 1077 Television Analyst, B & K Division of Dynascan Corporation.
Photofact Service, Sams.

Alignment tool set
Keyed rainbow/Bar-Dot generator
Hand tools
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Transistor checker
Oscilloscope
Soldering & desoldering tools
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.

2. Read "Color Signal," Pages 28-29 in _Instruction Manual for Model 1077 Television Analyst_.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

PROCEDURE: (continued)

3. Diagnose chroma section troubles using the television analyst.
4. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
5. Locate the chroma section trouble and verify it with the instructor.
6. After verification, correct the malfunction(s).
7. Proceed to the next LAP.

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Color Section Failures

OBJECTIVE:

Diagnose and repair malfunctions commonly found in the color section of a television.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Hand tools
Keyed rainbow/Bar-Dot generator
Oscilloscope
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Transistor checker
Soldering & desoldering tools
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the color television for possible color section failure.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the color section failure and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.08.06.A2-2
77.04.08.07.A2-2

Date: ______________________ **Date Published:** 12/2/77

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: DIAGNOSING CHROMA SECTION TROUBLES/ DIAGNOSING COLOR SECTION FAILURES

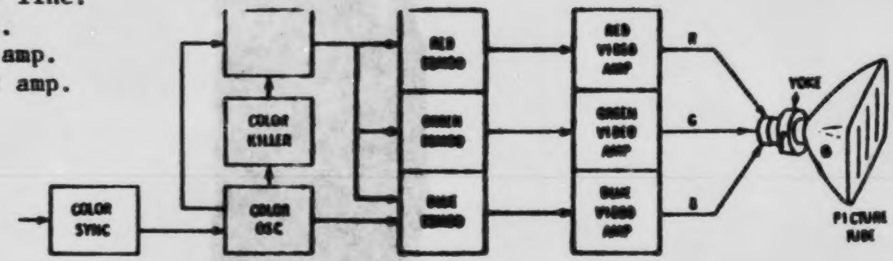
77.04.08.06.

1. The color sync signal received from a TV station is called:

   a. sync pulse.
   b. chroma sync pulse.
   c. video carrier information.
   d. color burst.

2. What section is missing from the block diagram below?

   a. delay line.
   b. A.C.C.
   c. NTCS amp.
   d. burst amp.


COLOR KILLER
COLOR SYNC
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE

3. The color magenta in a test pattern is:

   a. bluish red.
   b. greenish yellow.
   c. reddish yellow.
   d. blue green.

4. Where is the color generator output connection made to obtain a color pattern?

   a. the video amp.
   b. the antenna terminals.
   c. the I.F. amp.
   d. the delay line

5. **How many colors make a keyed rainbow pattern?**

   a. 14
   b. 7
   c. 10
   d. 3

77.04.08.07.

6. **What section should be checked if a picture looks like figure #14 in the TV Test Pamphlet?**

   a. video.
   b. picture tube.
   c. color demodulator.
   d. color amp.

7. To be able to use the color generator, a color TV must be on channel:

   a. 2 or 3.
   b. 3 or 4.
   c. 5 or 6.
   d. 6 or 7.

8. **What is wrong with figure #5 in the TV Test Pamphlet?**

   a. too much green.
   b. not enough red.
   c. no cyan.
   d. not enough blue.

10. How many stages of color amplification are there in most TV sets?

   a. 2
   b. 1
   c. 4
   d. 3

77.04.08.06.A2-2
77.04.08.07.A2-2

LAP TEST ANSWER KEY: DIAGNOSING CHROMA SECTION TROUBLES/ DIAGNOSING COLOR SECTION FAILURES

LAP .06

1. D
2. D
3. A
4. B
5. C

LAP .07

6. A
7. B
8. B
9. A
10. A

Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

File Code: 77.04.08.08.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Troubleshooting Color Problems

OBJECTIVE:

Describe typical symptoms commonly related to loss of color and color intensity in a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multipe-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 16, Sections 16-4 and 16-5, in the above resource.
2. Answer review questions 1-9 at end of Chapter 16.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): P. Schuster, R. Arneson, B. Vetter

Student: ______________________ **File Code:** 77.04.08.08.A2-2

Date: ______________________ **Date Published:** 12/2/77

LAP TEST: TROUBLESHOOTING COLOR PROBLEMS

1. If the overall color picture is weak, what section should be checked?

   a. 3.58 MHZ oscillator.
   b. color I.F.
   c. demodulator.
   d. picture tube.

2. What section will prevent the hue control from achieving 100% effectiveness?

   a. color oscillator.
   b. matrixing.
   c. phase shift.
   d. color I.F.

3. If two colors appear normal but the third is displaying the wrong color, what section should be checked?

   a. 3.58 MHZ oscillator.
   b. color I.F.
   c. demodulator.
   d. A.C.C.

4. Which section of a color TV set, if malfunctioning, will result in no color?

   a. color video amp.
   b. demodulator.
   c. picture tube.
   d. color I.F.

5. Where should a technician normally start troubleshooting a no-color symptom?

   a. 3.58 MHZ oscillator.
   b. color sync amp.
   c. video amp.
   d. color I.F.

6. What keeps the 3.58 MHZ oscillator on frequency in the color section?

   a. diode.
   b. crystal.
   c. horizontal sync pulse.
   d. feedback.

7. How many colors make up a NTCS color pattern?

   a. 10
   b. 11
   c. 3
   d. 7

8. Before a technician sets out to troubleshoot the chroma section of a color TV, what should he do first?

   a. check the sync separator.
   b. examine the yoke.
   c. check the audio circuitry.
   d. check the black and white picture.

9. What test instrument would be the most useful in troubleshooting the chroma section?

   a. oscilloscope.
   b. V.O.M.
   c. cable TV.
   d. V.T.V.M.

10. How many colors make up a keyed rainbow pattern?

   a. 3
   b. 10
   c. 9
   d. 7

LAP TEST ANSWER KEY: TROUBLESHOOTING COLOR PROBLEMS

1. B
2. C
3. C
4. D
5. B
6. B
7. D
8. D
9. A
10. B

File Code: 77.04.08.09.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Color Demodulation

OBJECTIVE:

Describe circuit functions and characteristics used in demodulating chroma signals.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multipe-choice test about this LAP.

RESOURCES:

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 7, "Color Demodulation," in the Color-TV Training Manual.
2. Answer the review questions at the end of Chapter 7.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.08.09.A2-2

Date: ______________________ Date Published: ______________________

Family Education Program

LAP TEST: COLOR DEMODULATION

1. The purpose of the chorminance demodulators in a color receiver is to ______________ the signal of the modulators in a color transmitter.

   a. reverse.
   b. invert.
   c. amplify.
   d. modulate.

2. The I & Q signals are used at the transmitter to modulate the ______________ of the separate portions of a divided carrier.

   a. amplitude.
   b. frequency.
   c. phasing.
   d. I signal.

3. The demodulator circuits in a color set must be capable of detecting both the phase and ______________ of the color signal.

   a. frequency.
   b. amplitude.
   c. horizontal pulse.
   d. retrace time.

4. The color bars are electrically represented by the color signal in the following sequence: red, yellow, green, cyan, blue, magenta and _______.

   a. black.
   b. orange.
   c. yellow green.
   d. white.

5. The polarity of the output signal on the plate of a demodulator tube would depend upon the polarity of the ______________ applied to the grid.

   a. burst.
   b. c-w signal.
   c. bias.
   d. Q signal.

6. The filter network in I & Q demodulator circuits offers a time delay to the ______________ signal.

   a. I signal.
   b. Q signal.
   c. c-w signal.
   d. phase reference.

7. In a sheet beam tube, the function of the internal shield is to suppress the ______________ that occurs between the two plates.

   a. secondary emission.
   b. space charge.
   c. gas.
   d. capacitance.

8. A sheet beam demodulator can be used as a separate ______________ demodulator in the way it samples two separate signals.

   a. I signal.
   b. Q signal.
   c. synchronous.
   d. non-synchronous.

9. The amplitude of the output signal from each demodulator in a diode system is dependent upon the amount of ______________ through each section of the diode.

   a. voltage.
   b. current.
   c. signal.
   d. the sync pulse.

10. In receivers which employ high level demodulators, the color difference signals are supplied directly to?

   a. the matrix section.
   b. the demodulator.
   c. CRT.
   d. color difference amps.

1. A
2. A
3. B
4. D
5. B
6. A
7. A
8. C
9. B
10. C

File Code: 77.04.08.10.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Loss of One Color

OBJECTIVE:

Given typical symptoms commonly related to loss of one color in a color television set, identify the color circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of Loss of One Color" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 29 in the response manual.
2. Complete the Practice Exercises for Lesson 29.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.11.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Symptoms of Loss of One Color

OBJECTIVE:

Observe symptoms commonly related to malfunctions causing the loss of one color in a color television, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 30, Loss of One Color.

Projector.

PROCEDURE:

1. View Film Loop 30 indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Student: ______________________ File Code: 77.04.08.10.A2-2
77.04.08.11.A2-2

Date: ______________________ Date Published: 12/2/77

Mountain-Plains Education &
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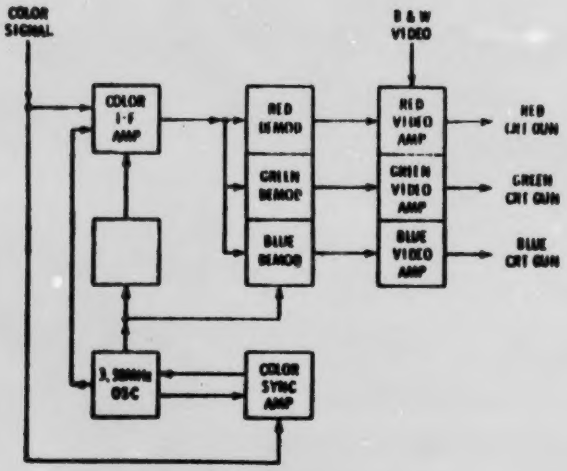
Glasgow AFB, Montana 59231

LAP TEST: LOSS OF ONE COLOR AND SYMPTOMS

77.04.08.10.

1. What circuit is missing from this chroma section of a TV?

   a. color killer.
   b. burst amp.
   c. demodulator.
   d. A.C.C.


COLOR SIGNAL
B & W VIDEO
COLOR I-F AMP
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
RED CRT GUN
GREEN CRT GUN
BLUE CRT GUN
3.58MHz OSC
COLOR SYNC AMP

2. What section could cause the picture to appear like figure #14 in the TV Test Pamphlet?

   a. A.G.C.
   b. video section.
   c. R.F. amp.
   d. 1st I.F. amp.

3. How can CRT be checked to see if it is the cause of color loss?

   a. check the hi-voltage.
   b. rainbow generator.
   c. look at the screen.
   d. CRT checker.

77.04.08.11.

4. What is wrong with the test pattern displayed in figure #13 in the TV Test Pamphlet?

   a. excess amount of blue.
   b. not enough red.
   c. out of phase.
   d. not enough green.

5. What is the problem with a TV that displays a screen like figure #5 in the TV Test Pamphlet?

   a. no magenta.
   b. no red.
   c. too much blue.
   d. too much green.

6. What is the probable cause of the pattern displayed by figure #6 in the TV Test Pamphlet?

   a. too much green.
   b. not enough blue.
   c. too much red.
   d. not enough red.

7. Diagnose figure #11 in the TV Test Pamphlet:

   a. too much blue.
   b. it's normal.
   c. not enough green.
   d. not enough red.

8. Refer to figure #7 in the TV Test Pamphlet. What is the problem with the screen shown?

   a. not enough blue.
   b. not enough red.
   c. too much green.
   d. too much blue.

9. What is wrong with the test pattern dipicted by figure #12 in the TV Test Pamphlet?

   a. no green.
   b. no yellow.
   c. excess red.
   d. excess blue.

10. What section of a color TV could cause a test pattern to look like figure #15 in the TV Test Pamphlet?

   a. color killer.
   b. picture tube.
   c. generator.
   d. I.F. section.

77.04.08.10.A2-2
77.04.08.11.A2-2

LAP TEST ANSWER KEY: LOSS OF ONE COLOR AND SYMPTOMS

LAP .10

1. A
2. B
3. D

LAP .11

4. A
5. B
6. C
7. B
8. C
9. A
10. A

File Code: 77.04.08.12.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Loss of One Color

OBJECTIVE:

Given a television set with problem(s) related to loss of one color in a color television set, diagnose and record comments on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Cathode ray tube checker
Hand tools
Oscilloscope
Soldering & desoldering tools
TSD Trainer or television set
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the color television for possible loss of one color.
3. After diagnosis is completed, fill in all requested data on a diag[illegible]is sheet.
4. Locate the malfunction(s) and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Student: ______________________ File Code: 77.04.08.12.A2-2

Date: ______________________ Date Published: 12/2/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: DIAGNOSING LOSS OF ONE COLOR

1. What should be checked first when the symptom is no color?

   a. burst amp.
   b. color killer control.
   c. A.C.C. control.
   d. demodulator.

2. Where should a repairman normally start troubleshooting a no-color symptom?

   a. video amp.
   b. burst amp.
   c. 3.58 MHZ oscillator.
   d. color sync amp.

3. How can a CRT be checked to see if it is the cause of one color loss?

   a. picture tube checker.
   b. check the hi-voltage.
   c. use a rainbow checker.
   d. view the screen.

4. What keeps the 3.58 MHZ oscillator on frequency in the color section?

   a. horizontal sync pulse.
   b. feedback.
   c. crystal.
   d. diode.

5. How many colors make up a keyed rainbow pattern?

   a. 10
   b. 3
   c. 8
   d. 7

6. Where does the output of the color I.F. amp go in a color TV set?

   a. color killer.
   b. sync amp.
   c. demodulator.
   d. oscillator.

7. What is wrong with figure #1 in the TV Test Pamphlet?

   a. it's normal.
   b. not enough green.
   c. not enough red.
   d. excessive blue.

8. What is wrong with figure #3 in the TV Test Pamphlet?

   a. no blue.
   b. excessive green.
   c. no cyan.
   d. excessive red.

9. Before a serviceman troubleshoots the chroma section, what should be checked first?

   a. the audio circuitry.
   b. the monochrome picture.
   c. the yoke.
   d. sync separator.

10. Where does the output of the color sync amp go in a color TV set?

   a. color I.F.
   b. demodulator.
   c. oscillator.
   d. color killer.

LAP TEST ANSWER KEY: DIAGNOSING LOSS OF ONE COLOR

1. B
2. D
3. A
4. C
5. A
6. C
7. A
8. A
9. B
10. C

File Code: 77.04.08.13.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Conditions Causing Loss of Color

OBJECTIVE:

Describe typical symptoms commonly related to loss of color in a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of No Color" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 16, Section 16-4, in the above resource.
2. Answer review questions 10-16 at end of Chapter 16.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.14.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Loss of Color

OBJECTIVE:

Given typical symptoms commonly related to loss of color in a color television, identify the chroma circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Symptoms of No Color" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 28 in the response manual.
2. Complete the Practice Exercises for Lesson 28.
3. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Mountain-Plains Education &
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File Code: 77.04.08.15.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Symptoms of No Color

OBJECTIVE:

Given typical symptoms commonly related to loss of color in a television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 29, No Color.

Projector.

PROCEDURE:

1. View Film Loop 29 indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Student: ______________________ File Code: 77.04.08.13.A2-2
77.04.08.14.A2-2
77.04.08.15.A2-2

Date: ______________________ Date Published: 12/2/77

LAP TEST: CONDITIONS CAUSING LOSS OF COLOR/LOSS OF COLOR/
SYMPTOMS OF NO COLOR

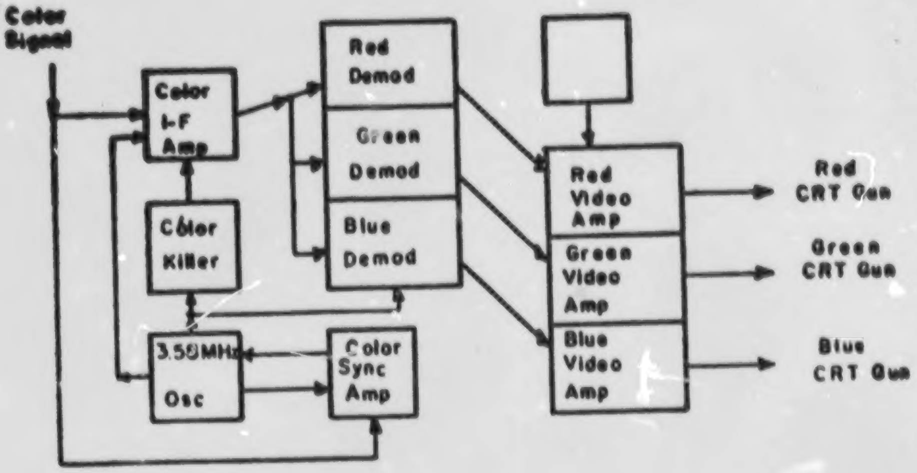
77.04.08.13.

1. What section will cause a pattern to look like figure #15 in the TV Test Pamphlet?

   a. picture tube.
   b. color killer.
   c. video I.F.
   d. A.G.C.

2. What section is missing from this block diagram?

   a. horizontal sync pulse.
   b. video.
   c. audio.
   d. A.G.C.


Color Signal
Color I-F Amp
Color Killer
3.58MHz Osc
Color Sync Amp
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Red CRT Gun
Green CRT Gun
Blue CRT Gun

3. What circuit can malfunction and cause a color TV set to look like figure #15 in the TV Test Pamphlet?

   a. R.F. amp.
   b. picture tube.
   c. burst amp.
   d. mixer.

4. Which circuit can cause a test pattern to look like figure #15 in the TV Test Pamphlet?

   a. picture tube.
   b. color killer.
   c. A.G.C.
   d. video I.F.

77.04.08.14.

5. Which of the following symptoms best describes the probable cause of the pattern shown in figure #2 in the TV Test Pamphlet?

   a. bad demodulator.
   b. no burst amp.
   c. 3.58 MHZ oscillator is off frequency.
   d. bad color I.F. amp.

6. Refer to figure #1 in the TV Test Pamphlet. Which of the following symptoms best describes this test pattern?

   a. an excessive amount of blue.
   b. a lack of cyan.
   c. a normal test pattern.
   d. an excessive amount of green.

7. What is wrong with the test pattern displayed by figure #12 in the TV Test Pamphlet?

   a. excessive amount of blue.
   b. excessive amount of red.
   c. no green.
   d. no magenta.

8. Which of the following symptoms best describes the reason for the faulty test pattern shown in figure #4 of the TV Test Pamphlet?

   a. 3.58 MHZ oscillator off frequency.
   b. horizontal out of sync.
   c. bad A.C.C.
   d. malfunctioning sync separator.

77.04.08.15.

9. What is wrong with the test pattern depicted in figure #7 in the TV Test Pamphlet?

   a. not enough red.
   b. too much green.
   c. not enough blue.
   d. not enough yellow.

10. The first step in checking a color TV with a no-color problem is to:

   a. check the demodulator.
   b. check for sync pulse.
   c. check for color burst.
   d. check the tubes.

77.04.08.13.A2-2
77.04.08.14.A2.2
77.04.08.15.A2-2

LAP TEST ANSWER KEY: CONDITIONS CAUSING LOSS OF COLOR/ LSS OF COLOR/SYMPTOMS OF NO COLOR

LAP .13

1. B
2. B
3. C
4. B

LAP .14

5. C
6. C
7. C
8. B

LAP .15

9. B
10. C

File Code: 77.04.08.16.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Troubleshooting the Color Receiver

OBJECTIVE:

Describe the troubleshooting procedure used in the repair of color receivers.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color-TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 12, "Troubleshooting the Color Receiver" in the above resource.
2. Answer the review questions at the end of Chapter 12.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter, [illegible]

Student: ______________________ **File Code:** 77.04.08.16.A2-2

Date: ______________________ **Date Published:** 12/5/77

Family Education Program

LAP TEST: TROUBLESHOOTING THE COLOR RECEIVER

1. Troubles which occur in a color receiver fall into _______ main categories?

   a. 3
   b. 4
   c. 2
   d. 5

2. The category of color troubles can be broken down into how many conditions?

   a. 3
   b. 4
   c. 1
   d. 2

3. Hum caused by a leaking tube is usually a result of a short between what two elements within a tube?

   a. plate and cathode.
   b. heater and plate.
   c. heater and cathode.
   c. cathode and grid.

4. How many colors make up the NTSC color pattern?

   a. 7
   b. 6
   c. 8
   d. 10

5. What is the exact frequency of the color oscillator in a receiver?

   a. 3.575945 MHZ.
   b. 3.597545 MHZ.
   c. 3.597555 MHZ.
   d. 3.579545 MHZ

6. Can a bad demodulator or its circuit cause a complete loss of color?

   a. No.
   b. Possibly.
   c. Yes.
   d. Only on certain solid state receivers.

7. Saturation of color is determined by the amplitude ratio between the luminance signal and _______?

   a. the color phase.
   b. the chrominance signal.
   c. the C-W signal.
   d. the output of the color generator.

8. A weak tube in the burst amplifier stage may not amplify the burst signal enough to cut off the ______ completely causing a loss of saturation.

   a. burst amp.
   b. bandpass amp.
   c. color killer.
   d. color osc.

9. A negative voltage at the grid of the bandpass amp is a good indication that the ______ is working?

   a. burst amp.
   b. bandpass amp.
   c. color osc.
   d. color killer.

10. The DC restoration voltage found in a color osc. circuit is fed back into the ______ of the tube?

   a. grid.
   b. plate.
   c. output circuit.
   d. cathode.

LAP TEST ANSWER KEY: TROUBLESHOOTING THE COLOR RECEIVER

1. C
2. A
3. C
4. A
5. D
6. B
7. B
8. C
9. D
10. A

File Code: 77.04.08.17.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing Loss of Color

OBJECTIVE:

Diagnose and repair a color television with problem(s) causing loss of color.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "One Excessive Color" LAP test and is taken after completing that LAP.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Capacitor checker
Hand tools
Keyed rainbow/Bar-Dot generator
Oscilloscope
Soldering & desoldering tools
TSD Trainer or television set
Television Analyst, B & K Model 1077B
Transistor checker
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible loss of color.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate malfunction(s) and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.18.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Conditions Causing One Excessive Color

OBJECTIVE:

Describe typical symptoms commonly related to one excessive color in a color television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-**choice test that is** combined with "One Excessive Color" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 16, Sections 16-2, 16-3 and 16-8, in the above resource.
2. Answer review questions 18-20 at the end of Chapter 16.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

File Code: 77.04.08.19.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: One Excessive Color

OBJECTIVE:

Given typical symptoms commonly related to one excessive color in a color television, identify the circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 30 in the response manual.
2. Complete the Practice Exercises for Lesson 30.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

77.04.08.17.A2-2
77.04.08.18.A2-2

Student: ______________________ **File Code:** 77.04.08.19.A2-2

Date: ______________________ **Date Published:** 12/5/77

LAP TEST: DIAGNOSING LOSS OF COLOR/CONDITIONS CAUSING ONE EXCESSIVE COLOR/ONE EXCESSIVE COLOR

77.04.08.17.

1. What will cause a pattern to look like figure #15 in the TV Test Pamphlet?

    a. video amp.
    b. color killer.
    c. demodulator.
    d. A.G.C.

2. What would cause a TV screen to appear like figure #2 in the TV Test Pamphlet?

    a. A.G.C.
    b. color killer.
    c. vertical hold.
    d. poor sync.

3. What is wrong with a TV that displays a picture like figure #5 in the TV Test Pamphlet?

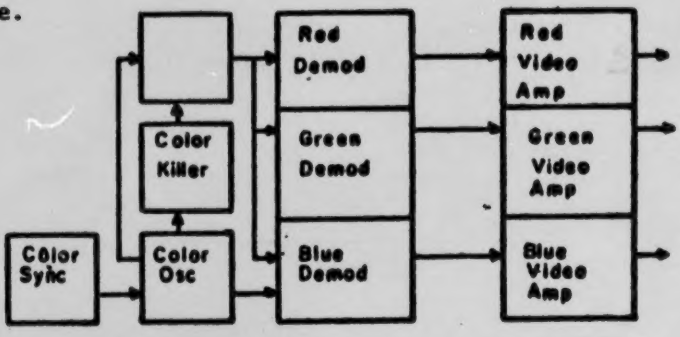
    a. no red.
    b. excessive blue.
    c. excessive green.
    d. no green.

4. What symptom most accurately describes the pattern illustrated by figure #11 of the TV Test Pamphlet?

    a. out of sync.
    b. missing one color.
    c. normal.
    d. missing two colors.

5. **What section is missing in this block diagram?**

   a. **horizontal** sync pulse.
   b. **A.G.C.**
   c. **A.C.C.**
   d. **burst amp.**


Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Color Killer
Color Osc
Color Sync

77.04.08.18.

6. **What is wrong with figure #13 in the TV Test Pamphlet?**

   a. **not enough** green.
   b. **not enough** cyan.
   c. **excessive** blue.
   d. **not enough** red.

7. **What is wrong with figure #7 in the TV Test Pamphlet?**

   a. **poor** red.
   b. **no magenta.**
   c. **excessive** green.
   d. **no** blue.

8. **Which of the following symptoms most accurately describes the pattern illustrated by figure #6 in the TV Test Pamphlet?**

   a. no blue.
   b. excessive red.
   c. no green.
   d. no cyan.

77.04.08.19.

9. **Refer to figure #6 in the TV Test Pamphlet. What is wrong with this test pattern?**

   a. too much cyan.
   b. excessive red.
   c. no blue.
   d. no green.

10. What is wrong with figure #13 in the TV Test Pamphlet?

    a. no green.
    b. no red.
    c. excessive blue.
    d. too much yellow.

77.04.08.17.A2-2
77.04.08.18.A2-2
77.04.08.19.A2-2

LAP TEST ANSWER KEY: DIAGNOSING LOSS OF COLOR/CONDITIONS CAUSING ONE EXCESSIVE COLOR

LAP .17

1. B
2. D
3. A
4. C
5. D

LAP .18

6. C
7. C
8. B

LAP .19

9. B
10. C

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File Code: 77.04.08.20.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: __________

Date: __________

PERFORMANCE ACTIVITY: Symptoms of One Excessive Color

OBJECTIVE:

Observe symptoms causing one excessive color in a color television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "No Color Sync" LAP test and is taken after completing that LAP.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 31, One Color Is Excessive.

Projector.

PROCEDURE:

1. View Film Loop 31 as indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.21.A2-0

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Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Diagnosing One Excessive Color

OBJECTIVE:

Diagnose and repair a color television having one excessive color.

EVALUATION PROCEDURE:

The objective of this activity will be evaluated by a unit performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "No Color Sync" LAP test and is taken after completing that LAP.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Capacitor checker
Cathode ray tube checker
Hand tools
Keyed rainbow/Bar-Dot generator
Soldering and desoldering tools
Oscilloscope
TSD Trainer or television set
Transistor checker
Television Analyst, B & K Model 1077B
Vacuum tube checker
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible one excessive color.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.22.A2-0

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Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: No Color Sync

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a color television, identify the color sync circuit in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color Television Diagnosis Sheet.
Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read Lesson 31 in the response manual.
2. Complete the Practice Exercises for Lesson 31.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Student: ____________________ **File Code:** 77.04.08.20.A2-2
77.04.08.21.A2-2
77.04.08.22.A2-2

Date: ____________________ **Date Published:** 12/5/77

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

LAP TEST: SYMPTOMS OF AND DIAGNOSING ONE EXCESSIVE COLOR/NO COLOR SYNC

77.04.08.20.

1. What is wrong with the test pattern dipicted in figure #7 in the TV Test Pamphlet?

   a. not enough yellow.
   b. not enough blue.
   c. not enough red.
   d. too much green.

2. What is wrong with the test pattern displayed by figure #12 in the TV Test Pamphlet?

   a. excessive blue.
   b. no green.
   c. excessive red.
   d. no magenta.

3. The test pattern in figure #6 in the TV Test Pamphlet shows:

   a. no blue.
   b. excessive red.
   c. no green.
   d. excessive green.

77.04.08.21.

4. A raster with the wrong color over half of the screen is a symptom of:

   a. misadjusted screen control.
   b. bad CRT.
   c. poor focus.
   d. incorrect purity.

5. What controls the gain of the burst amp in the chroma section?

   a. color intensity control.
   b. tint control.
   c. A.C.C.
   d. A.G.C.

6. In which section of a color TV are the screen controls located?

   a. A.C.C.
   b. purity rings.
   c. demodulator.
   d. chroma video amp.

77.04.08.22.

7. What is the purpose of the 3.58 MHZ color oscillator in the chroma section?

   a. to turn on the A.C.C.
   b. to sync with the demodulator.
   c. to "beat" with the horizontal sync pulse.
   d. to "beat" with the station burst.

8. The first thing that should be checked on a no color problem is the:

   a. color killer adjustment.
   b. test equipment.
   c. black and white picture.
   d. TV signal.

9. What is the most useful piece of test equipment for troubleshooting a solid state chorma section?

   a. V.O.M.
   b. scope.
   c. transistor checker.
   d. V.T.V.M.

10. What is the problem with the pattern depicted by figure #16 in the TV Test Pamphlet?

   a. nothing.
   b. one color missing.
   c. excessive blue.
   d. two colors missing.

LAP TEST ANSWER KEY: SYMPTOMS OF AND DIAGNOSING ONE EXCESSIVE COLOR/ NO COLOR SYNC

LAP .20

1. D
2. B
3. B

LAP .21

4. D
5. C
6. D

LAP .22

7. D
8. A
9. B
10. B

File Code: 77.04.08.23.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ________________

Date: ________________

PERFORMANCE ACTIVITY: Symptoms of No Color Sync

OBJECTIVE:

Observe symptoms related to typical malfunctions in the color sync section of a color television set, record comments and diagnosis along with suggested corrective action on a diagnosis sheet.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing No Color Sync" LAP test and is taken after completing that LAP.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop 32, No Color Sync.

Projector.

PROCEDURE:

1. View Film Loop 32 as indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

File Code: 77.04.08.24.A2-0

Date Published: 12/23/76

Mountain-Plains Education &
Economic Development
Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Diagnosing No Color Sync

OBJECTIVE:

Diagnose and repair a color television with a malfunction(s) commonly found in the color sync section.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

The objective of this activity will be evaluated by a unit performance test.

RESOURCES:

Color Television Diagnosis Sheet.
Photofact Service, Sams.

Alignment tool set
Hand tools
Oscilloscope
Keyed rainbow/Bar-Dot generator
Soldering & desoldering tools
Television Analyst, B & K Model 1077B
Transistor checker
TSD Trainer or television set
Vacuum tube checker
Vacuum tube voltmeter
Volt-ohmmeter

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete this LAP.
2. Diagnose the television for possible no color sync.
3. After diagnosis is completed, fill in all requested data on a diagnosis sheet.
4. Locate the malfunction(s) for no color sync and verify it with the instructor.
5. After verification, correct the malfunction(s).
6. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster, B. Vetter

Student: ______________________ **File Code:** 77.04.08.23.A2-2
77.04.08.24.A2-2

Date: ______________________ **Date Published:** 12/5/77

LAP TEST: SYMPTOMS OF AND DIAGNOSING NO COLOR SYNC

77.04.08.23.

1. What section will not give a loss of color sync in a color television?

   a. color I.F.
   b. reference oscillator.
   c. color sync amp.
   d. demodulator.

2. What device is used in the 3.58 MHZ oscillator to keep it exactly on frequency?

   a. crystal.
   b. transistor.
   c. tunnel diode.
   d. LC network.

3. What section of a color TV does the color sync amp feed its signal to?

   a. 3.58 MHZ
   b. color killer.
   c. color I.F. amp.
   d. demodulators.

4. Besides the color sync amp causing loss of color sunc, what other circuit might do so?

   a. flyback transformer.
   b. phase lock.
   c. sync separator.
   d. gating.

5. The output of the color I.F. goes where?

   a. color killer.
   b. demodulator.
   c. 3.59 MHZ oscillator.
   d. color sync amp.

77.04.08.24.

6. What will cause a pattern to look like figure #16 in the TV Test Pamphlet?

   a. A.G.C.
   b. demodulator.
   c. color killer.
   d. video amp.

7. What would cause a TV screen to appear like figure #2 in the TV Test Pamphlet?

   a. A.G.C.
   b. poor sync.
   c. vertical hold.
   d. color killer.

8. What section failure will result in a picture like figure #16 in the TV Test Pamphlet?

   a. color sync amp.
   b. demodulator.
   c. video outputs.
   d. color killer.

9. The output of the blue demodulator goes where?

   a. red video amp.
   b. green video amp.
   c. blue video amp.
   d. color killer.

10. The process of removing residual magnetism from a TV is called:

    a. convergence.
    b. purification.
    c. degaussing.
    d. desaturizing.

LAP TEST ANSWER KEY: SYMPTOMS OF AND DIAGNOSING NO COLOR SYNC

LAP .23

1. D
2. A
3. A
4. D
5. B

LAP .24

6. B
7. B
8. B
9. C
10. C

Mountain-Plains Education & Economic Development Program, Inc.
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File Code: 77.04.08.25.A2-0

Date Published: 12/23/76

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Aligning the Color Receiver

OBJECTIVE:

Describe the procedure and technique used in the alignment of the chroma section in a color receiver.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Color TV Training Manual, Sams Editorial Staff.

PROCEDURE:

1. Read Chapter 11, "Aligning the Color Receiver" in the above resource.
2. Answer the questions at the end of Chapter 11.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ____________________ File Code: 77.04.08.25.A2-2

Date: ____________________ Date Published: 12/5/77

Family Education Program

LAP TEST: ALIGNING COLOR RECEIVER

1. What is the band width of a color receiver as compared to a monochrome set?

   a. 4.5 KHZ.
   b. 4.5 MHZ.
   c. 3.58 MHZ.
   d. 47.25 MHZ.

2. For best results in a color set, the video I-F section should be flat throughout a range of?

   a. 4 MHZ.
   b. 4.5 MHZ.
   c. 3.58 MHZ.
   d. 4 KHZ.

3. The signal in a color set at the chrominance takeoff point consists of how many different types of signals?

   a. 6
   b. 4
   c. 5
   d. 7

4. The original and regenerated subcarriers in the 3.58 osc. must agree in phase within ______ degrees so that phase modulation of the side bands may be accurately detected.

   a. 4.5
   b. 5
   c. 5.5
   d. 6

5. The control system within the oscillator must keep the oscillator locked in for approximately ______ cycles between the color bursts.

   a. 440
   b. 3.58
   c. 220
   d. 440

6. The tint control should properly change the phase of the color signal at least ______ degrees?

   a. 45
   b. 30
   c. 220
   d. 440

7. The RF and IF sections must applify to a band of frequencies from about 4.2 MHZ above the picture carrier to ______ below the carrier?

   a. 4.5 MHZ.
   b. 47.25 MHZ.
   c. 3.58 MHZ.
   d. .75 MHZ.

8. What is the band pass of most B&W sets as set by the manufacturer's specs?

   a. 3.27 MHZ.
   b. 3.25 MHZ.
   c. 4. MHZ.
   d. 3.58 MHZ lower.

9. What is the video IF subcarrier frequency of the color signal?

   a. 42.17 MHZ.
   b. 4. MHZ.
   c. 3.58 MHZ.
   d. .75 MHZ.

10. What is the video IF frequency of the audio subcarrier in color sets?

   a. 4.5 KHZ.
   b. 4. MHZ.
   c. 4.5 MHZ.
   d. 42.17 MHZ.

TT.04.08.25.A2-2

LAP TEST ANSWER KEY: ALIGNING COLOR RECEIVER

1. B
2. A
3. C
4. B
5. C
6. B
7. D
8. B
9. A
10. C

Student: ______________________ File Code: 77.04.08.00.B2-2

Date: ______________________ Date Published: 9/18/75

UNIT POST TEST: TELEVISION COLOR SECTION TROUBLES

77.04.08.01.

1. Refer to figure #2 in the T.V. Test Pamphlet. What section of the T.V. should be checked when this pattern occurs?

   A. sync-separator
   B. color oscillator
   C. vertical oscillator
   D. horizontal oscillator

2. Refer to figure #14 in the T.V. Test Pamphlet. Which section of the T.V. should be checked when the screen appears like this?

   A. color amp
   B. color demodulator
   C. video
   D. picture tube

3. Refer to figure #13 in the T.V. Test Pamphlet. What is wrong with the pattern depicted?

   A. no green
   B. out of phase
   C. no red
   D. too much blur

4. How many colors make up a keyed rainbow pattern?

   A. 13
   B. 12
   C. 10
   D. 11

5. What is the probable cause of the pattern displayed by figure #1 in the T.V. Test Pamphlet?

   A. nothing, the pattern as displayed is normal
   B. not enough color bars are displayed
   C. an excessive amount of blue
   D. not enough red

77.04.08.02.

6. What is wrong with figure #5 in the T.V. Test Pamphlet?

   A. no red
   B. too much blue
   C. out of phase
   D. too much green

7. Which of the following symptoms best describes the pattern illustrated by figure #13 in the T.V. Test Pamphlet?

   A. no green
   B. no cyan
   C. too much blue
   D. no red

8. Refer to figure #11 in the T.V. Test Pamphlet. What is wrong with this pattern?

   A. nothing
   B. no red
   C. not enough green
   D. too much blue

9. What is the problem with the T.V. picture as illustrated by figure #6 in the T.V. Test Pamphlet?

   A. no blue
   B. too much red
   C. no gray
   D. no green

10. What is wrong with the rainbow pattern as illustrated by figure #3 in the T.V. Test Pamphlet?

    A. too much red
    B. too much green
    C. out of phase
    D. no blue

77.04.08.03.

11. What section of a T.V. will cause a picture to appear like figure #4 in the T.V. Test Pamphlet?

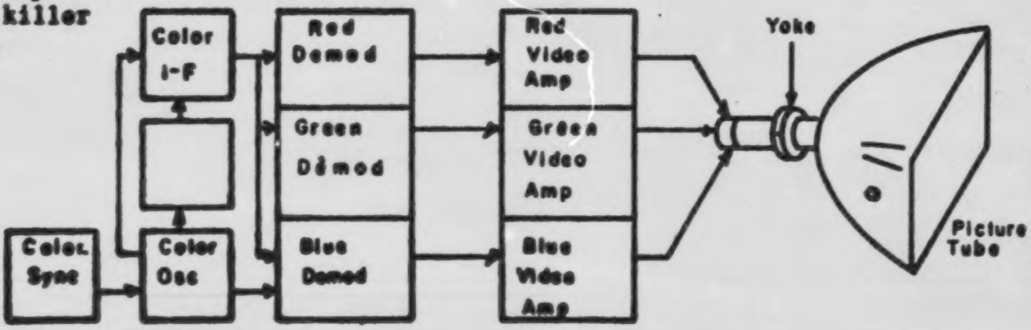
    A. horizontal oscillator
    B. 3.58 MHZ oscillator
    C. sync separator
    D. A.G.C.

12. What is the black and white section of a color T.V. called?

    A. mono-demodulator
    B. mono-amps
    C. chroma-color
    D. monochrome

13. What section is missing from the block diagram provided below?

    A. NTSC amp
    B. burst amp
    C. color killer
    D. A.C.C.


Color I-F
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Color Sync
Color Osc
Yoke
Picture Tube

14. How many stages of color amplification are there in most T.V. sets?

    A. 3
    B. 1
    C. 2
    D. 4

15. The color-sync signal received from a T.V. station is called:

    A. sync pulse.
    B. color burst.
    C. chroma-sync pulse.
    D. video carrier information.

77.04.08.04.

16. What is the predominant symptom of figure #6 in the T.V. Test Pamphlet?

    A. no cyan
    B. no blue
    C. excess green
    D. excess red

17. What is the problem with the test pattern of figure #7 in the T.V. Test Pamphlet?

    A. not enough blue
    B. no cyan
    C. too much green
    D. not enough red

18. What is wrong with the test pattern depicted by figure #5 in the T.V. Test Pamphlet?

A. no magenta
B. no red
C. excessive amount of green
D. excessive amount of blue

19. What is wrong with the pattern displayed by figure #1 in the T.V. Test Pamphlet?

A. nothing
B. too much red
C. not enough blue
D. too much blue

20. What section could cause a T.V. picture to look like figure #8 in the T.V. Test Pamphlet?

A. A.G.C.
B. first I.F. amp
C. A.C.C.
D. video amp

77.04.08.05.

21. The four basic symptom categories for a color set are sound, video, color, and:

A. raster.
B. signal.
C. sweep.
D. CRT.

22. Where is the color generator output connection made to obtain a color pattern?

A. the antenna terminals
B. the delay line
C. the I.F. amp
D. the video amp

23. How many colors make a keyed rainbow pattern?

A. 7
B. 11
C. 10
D. 13

24. The color magenta in a test pattern is:

    A. reddish-yellow.
    B. greenish-yellow.
    C. bluish-red.
    D. blue-green.

25. The color sync signal received from a T.V. station is called:

    A. color burst.
    B. video carrier information.
    C. chroma-sync pulse.
    D. sync pulse.

77.04.08.06.

26. What section should be checked if a picture like figure #2 in the T.V. Test Pamphlet appears?

    A. sync-separator
    B. vertical oscillator
    C. horizontal oscillator
    D. color oscillator

27. How many stages of color amplification are there in most T.V. sets?

    A. 3
    B. 1
    C. 2
    D. 4

28. What section should be checked if a picture looks like figure #14 in the T.V. Test Pamphlet?

    A. video
    B. color demodulation
    C. color amp
    D. picture tube

29. What is wrong with figure #7 in the T.V. Test Pamphlet?

    A. no cyan
    B. not enough blue
    C. not enough red
    D. too much green

30. What is wrong with figure #5 in the T.V. Test Pamphlet?

    A. too much blue
    B. too much green
    C. out of phase
    D. no red

77.04.08.07.

31. What keeps the 3.58 MHZ oscillator on frequency in the color section?

    A. crystal
    B. feedback circuit
    C. horizontal sync pulse
    D. diode

32. What test instrument would be the most useful in troubleshooting the chroma section?

    A. V.O.M.
    B. oscilloscope
    C. cable T.V.
    D. V.T.V.M.

33. What section will prevent the hue control from achieving 100% effectiveness?

    A. color oscillator
    B. burst amp
    C. matrixing
    D. phase shift

34. If two colors appear normal, but the third is displaying the wrong color, what section should be checked?

    A. A.C.C.
    B. burst amp
    C. demodulator
    D. 3.58 MHZ oscillator

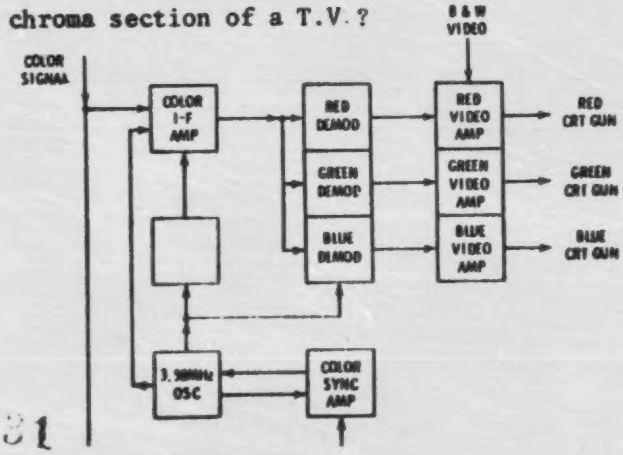
35. Where should a technician normally start troubleshooting a no-color symptom?

    A. burst amp
    B. 3.58 MHZ oscillator
    C. video amp
    D. color-sync amp

77.04.08.08.

36. What circuit is missing from this chroma section of a T.V.?

    A. demodulator
    B. A.C.C.
    C. color killer
    D. burst amp


B & W VIDEO
COLOR SIGNAL
COLOR I-F AMP
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
RED CRT GUN
GREEN CRT GUN
BLUE CRT GUN
3.58MHz OSC
COLOR SYNC AMP

77.04.08.09.

37. What section of a color T.V. could cause a test pattern to look like figure #15 in the T.V. Test Pamphlet?

    A. generator
    B. picture tube
    C. I.F. section
    D. color killer

38. What is wrong with the test pattern depicted by figure #12 in the T.V. Test Pamphlet?

    A. no green
    B. excess blue
    C. no yellow
    D. excess red

39. What is the probable cause of the pattern displayed by figure #6 in the T.V. Test Pamphlet?

    A. too much green
    B. not enough blue
    C. too much red
    D. not enough magenta

40. What part of the chroma section will cause a picture to look like figure #2 in the T.V. Test Pamphlet?

    A. burst amp
    B. A.C.C.
    C. color I.F. amp
    D. oscillator

77.04.08.10.

41. How can a CRT be checked to see if it is the cause of one color loss?

    A. view the screen
    B. picture tube checker
    C. check the hi-voltage
    D. use a rainbow checker

42. Where should a repairman normally start troubleshooting a no-color symptom?

    A. burst amp
    B. color-sync amp
    C. video amp
    D. 3.58 MHZ oscillator

43. What is wrong with figure #3 in the T.V. Test Pamphlet?

A. excessive green
B. no blue
C. excessive red
D. no cyan

44. What should be checked first when the symptom is no color?

A. burst amp
B. demodulator
C. color killer control
D. A.C.C. control

45. What keeps the 3.58 MHZ oscillator on frequency in the color section?

A. horizontal sync pulse
B. feedback
C. crystal
D. diode

77.04.08.11.

46. What section will cause a pattern to look like figure #15 in the T.V. Test Pamphlet?

A. picture tube
B. color killer
C. video I.F.
D. A.G.C.

47. What section can cause a picture to look like figure #2 in the T.V. Test Pamphlet?

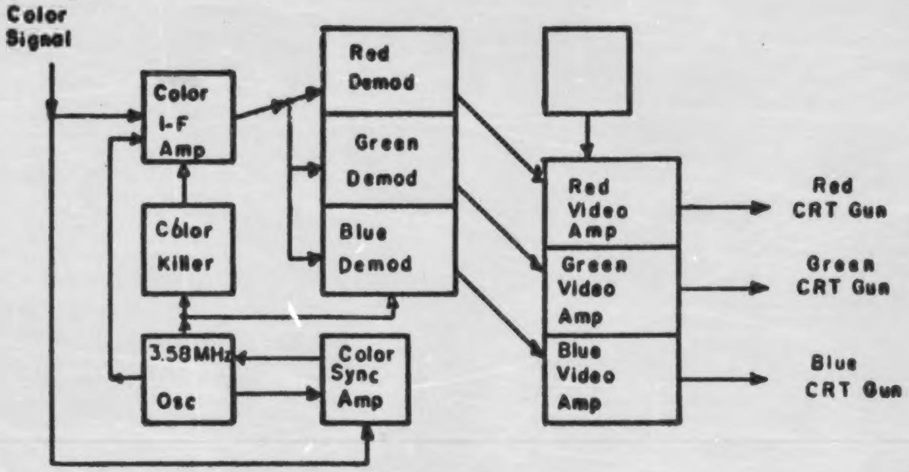
A. oscillator
B. demodulator
C. burst amp
D. horizontal hold

48. The first step in checking a color T.V. with a no color problem is to:

A. check for color burst.
B. check the demodulator.
C. check for sync pulse.
D. check the tubes.

49. What section is missing from this block diagram?

- A. video
- B. audio
- C. A.G.C.
- D. horizontal sync pulse


Color Signal
Color I-F Amp
Color Killer
3.58MHz Osc
Color Sync Amp
Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Red CRT Gun
Green CRT Gun
Blue CRT Gun

50. What circuit can malfunction and cause a color T.V. set to look like figure #15 in the T.V. Test Pamphlet?

- A. burst amp
- B. R.F. amp
- C. picture tube
- D. mixer

77.04.08.12.

51. What is wrong with the test pattern displayed by figure #3 in the T.V. Test Pamphlet?

- A. an excessive amount of red
- B. an excessive amount of green
- C. no magenta
- D. no blue

52. Refer to figure #1 in the T.V. Test Pamphlet. Which of the following symptoms best describes this test pattern?

- A. an excessive amount of blue
- B. a normal test pattern
- C. a lack of cyan
- D. an excessive amount of green

53. Which of the following symptoms best describes the reason for the faulty test pattern shown in figure #4 of the T.V. Test Pamphlet?

- A. 3.58 MHZ oscillator off frequency
- B. bad A.C.C.
- C. malfunctioning sync separator
- D. horizontal out of sync

54. What is wrong with the test pattern depicted in figure #7 in the T.V. Test Pamphlet?

A. not enough blue
B. too much green
C. not enough red
D. not enough yellow

55. What is wrong with the test pattern depicted by figure #5 in the T.V. Test Pamphlet?

A. an excessive amount of green
B. no red
C. an excessive amount of blue
D. no cyan

77.04.08.13.

56. The first step in checking a color T.V. with a no color problem is to:

A. check for sync pulse.
B. check the tubes.
C. check for color burst.
D. check the demodulator.

57. What is wrong with figure #7 in the T.V. Test Pamphlet?

A. excessive green
B. not enough blue
C. not enough red
D. not enough yellow

58. What is wrong with the pattern depicted by figure #12 in the T.V. Test Pamphlet?

A. no green
B. too much blue
C. too much red
D. no magenta

59. What is wrong with figure #3 in the T.V. Test Pamphlet?

A. too much red
B. too much green
C. no blue
D. no magenta

60. What section will cause a pattern to look like figure #15 in the T.V. Test Pamphlet?

A. picture tube
B. color killer
C. A.G.C.
D. video I.F.

77.04.08.14.

61. What would cause a T.V. screen to appear like figure #2 in the T.V. Test Pamphlet?

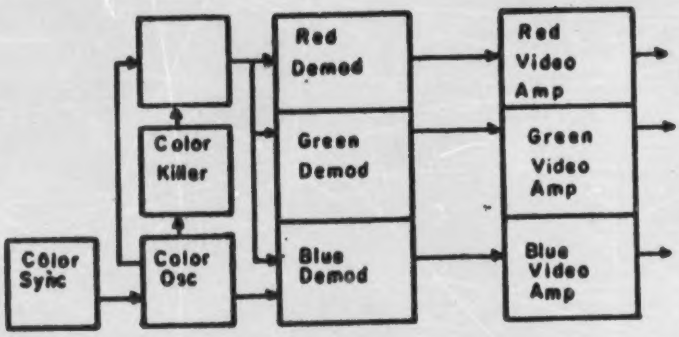
    A. color killer
    B. poor sync
    C. vertical hold
    D. A.G.C.

62. What type of pattern is depicted by figure #11 in the T.V. Test Pamphlet?

    A. split phase
    B. NTCS
    C. B + K analyst
    D. keyed rainbow

63. What section is missing in this block diagram?

    A. burst amp
    B. horizontal sync pulse
    C. A.C.C.
    D. A.G.C.


Red Demod
Green Demod
Blue Demod
Red Video Amp
Green Video Amp
Blue Video Amp
Color Killer
Color Sync
Color Osc

64. What will cause a pattern to look like figure #15 in the T.V. Test Pamphlet?

    A. color killer
    B. A.G.C.
    C. demodulator
    D. video amp

65. What is wrong with a T.V. that displays a picture like figure #5 in the T.V. Test Pamphlet?

A. excessive green
B. no red
C. excessive blue
D. no green

77.04.08.15.

66. What is wrong with figure #13 in the T.V. Test Pamphlet?

A. no green
B. excessive blue
C. no red
D. too much yellow

67. What is wrong with the test pattern depicted by figure #7 in the T.V. Test Pamphlet?

A. excessive green
B. no cyan
C. no red
D. not enough blue

77.04.08.16.

68. What is wrong with figure #13 in the T.V. Test Pamphlet?

A. excessive blue
B. not enough cyan
C. not enough green
D. not enough red

69. Refer to figure #6 in the T.V. Test Pamphlet. What is wrong with this test pattern?

A. excessive red
B. no blue
C. too much cyan
D. no green

70. Which of the following symptoms most accurately describes the pattern illustrated by figure #6 in the T.V. Test Pamphlet?

A. no green
B. no blue
C. no cyan
D. excessive red

71. If a television receiver has one excess color, what section may be checked with an oscilloscope to determine a malfunction?

    A. A.C.C. stage
    B. color killer
    C. Color Video Amp.
    D. 3.58 MHz oscillator

72. If a color television is receiving a B & W picture and there is color snow, what section will cause this problem?

    A. sync amp
    B. demodulator
    C. video amp
    D. color killer

73. What is wrong with the test pattern depicted in figure #7 in the T.V. Test Pamphlet?

    A. not enough blue
    B. too much green
    C. not enough red
    D. not enough yellow

74. What is wrong with the test pattern displayed by figure #12 in the T.V. Test Pamphlet?

    A. no magenta
    B. excessive blue
    C. excessive red
    D. no green

75. Which of the following symptoms most accurately describes the pattern illustrated by figure #6 in the T.V. Test Pamphlet?

    A. no green
    B. no blue
    C. excessive red
    D. no cyan

77.04.08.18.

76. What would cause peoples' faces to be purple on a color T.V. screen?

    A. bad CRT
    B. improperly aligned purity rings
    C. malfunctioning video amp
    D. misadjusted hue control

77. What is wrong with the test pattern displayed in figure #7 of the T.V. Test Pamphlet?

A. no blue
B. no yellow
C. excessive green
D. poor red

78. A raster with the wrong color over half of the screen is a symptom of:

A. incorrect purity.
B. poor focus.
C. bad CRT.
D. misadjusted screen control.

79. What controls the gain of the burst amp in the chroma section?

A. tint control
B. color intensity
C. A.C.C.
D. A.G.C.

80. Refer to figure #6 in the T.V. Test Pamphlet. What is the problem with this pattern?

A. excessive red
B. no blue
C. no green
D. no cyan

77.04.08.19.

81. What is the purpose of the 3.58 MHZ color oscillator in the chroma section?

A. to "beat" with the station burst
B. to turn on the A.C.C.
C. to sync with the demodulator
D. to "beat" with the horizontal sync pulse

82. The first thing that should be checked on a no-color problem is the:

A. black and white picture.
B. test equipment.
C. color killer adjustment.
D. T.V. signal.

83. What is the problem with the pattern depicted by figure #16 in the T.V. Test Pamphlet?

A. nothing
B. one color missing
C. excessive blue
D. two colors missing

84. What is the most useful piece of test equipment for troubleshooting a solid-state chroma section?

A. V.O.M.
B. scope
C. V.T.V.M.
D. transistor checker

85. Refer to figure #2 in the T.V. Test Pamphlet. What will cause a picture to look like this?

A. color killer
B. burst amp
C. A.C.C.
D. color sync amp

77.04.08.20.

86. What section will not give a loss of color sync in a color television?

A. demodulator
B. reference oscillator
C. color sync amp
D. color I.F.

87. What device is used in the 3.58 MHz oscillator to keep it exactly on frequency?

A. LC network
B. transistor
C. tunnel diode
D. crystal

88. What section of a color T.V. does the color sync amp feed its signal to?

A. 3.58 MHz
B. color killer
C. color I.F. amp
D. demodulators

89. Besides the color-sync amp causing loss of color sync, what other circuit might do so?

A. phase lock
B. gating
C. sync separator
D. flyback transformer

90. The output of the color I.F. goes where?

A. 3.59 MHz oscillator
B. color killer
C. demodulator
D. color sync amp

77.04.08.21.

91. What would cause a T.V. screen to appear like figure #2 in the T.V. Test Pamphlet?

A. vertical hold
B. A.G.C.
C. poor sync
D. color killer

92. What section failure will result in a picture like figure #16 in the T.V. Test Pamphlet?

A. demodulator
B. color killer
C. chroma amp
D. color sync amp

93. Loss of color sync will look like:

A. no color.
B. loss of vertical sync.
C. loss of horizontal sync.
D. excessive color.

94. The output of the blue demodulator goes where?

A. color killer
B. green video amp
C. red video amp
D. blue video amp

95. The process of removing residual magnetism from a T.V. is called:

    A. degaussing.
    B. purification.
    C. convergence.
    D. desaturizing.

UNIT POST TEST ANSWER KEY: TELEVISION COLOR SECTION TROUBLES

LAP 01	1.	B
	2.	C
	3.	D
	4.	C
	5.	A
LAP 02	6.	A
	7.	C
	8.	A
	9.	B
	10.	D
LAP 03	11.	A
	12.	D
	13.	C
	14.	C
	15.	B
LAP 04	16.	D
	17.	C
	18.	B
	19.	A
	20.	A
LAP 05	21.	A
	22.	A
	23.	C
	24.	C
	25.	A
LAP 06	26.	D
	27.	C
	28.	A
	29.	D
	30.	D
LAP 07	31.	A
	32.	B
	33.	D
	34.	C
	35.	D
LAP 08	36.	C
LAP 09	37.	D
	38.	A
	39.	C
	40.	D
LAP 10	41.	B
	42.	B
	43.	B
	44.	C
	45.	C
LAP 11	46.	B
	47.	A
	48.	A
	49.	A
	50.	A
LAP 12	51.	D
	52.	B
	53.	D
	54.	B
	55.	B
LAP 13	56.	C
	57.	A
	58.	A
	59.	C
	60.	B
LAP 14	61.	B
	62.	D
	63.	A
	64.	A
	65.	B
LAP 15	66.	B
	67.	A

UNIT POST TEST ANSWER KEY: TELEVISION COLOR SECTION TROUBLES

LAP 16	68.	A
	69.	A
	70.	D
LAP 17	71.	C
	72.	D
	73.	B
	74.	D
	75.	C
LAP 18	76.	D
	77.	C
	78.	A
	79.	C
	80.	A
LAP 19	81.	A
	82.	C
	83.	B
	84.	B
	85.	D
LAP 20	86.	A
	87.	D
	88.	A
	89.	B
	90.	C
LAP 21	91.	C
	92.	B
	93.	C
	94.	D
	95.	A

Student: ____________________ File Code: 77.04.08.00.A1-5

Date: ____________________ Date Published: 11/25/75

Family Pay Number: __________ Sex: M F (Circle 1)

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

UNIT PERFORMANCE TEST: TELEVISION COLOR SECTION TROUBLES

OBJECTIVE 1:

The student will diagnose malfunctions with regard to color section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the area of malfunction in the color section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in the color section.

The term "color section" refers to the following:

1. color killer section
2. color sync section
3. color oscillator section
4. color I.F. section
5. color demodulator section
6. video amp section

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. loss of color
2. loss of one color
3. loss of color sync
4. excess of one color

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defects he is presented with.

ASSIGNMENT:

CONDITIONS:

The student will be tested in an environment similar to that of a radio-TV repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service persons. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron, desoldering tools, B & K television analyst, oscilloscope, vacuum tube checker, volt-ohmmeter, keyed rainbow/bar-dot generator, hand tools and transistor checker.

Student: ______________________ **File Code:** 77.04.08.00.A1-5

Date: ______________________ **Date Published:** 11-14-74

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Glasgow AFB, Montana 59231

Family Pay Number: ____________ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION	
	Met	Not Met
Objective 1:		
1. Student will correctly diagnose color failures.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate		
the area of malfunctions with regard to color section		
failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to color failure		
section.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to color failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard		
to color failure.		

(Checklist continued)

	CRITERION	
	Met	Not Met
Criterion: Identification matches problem assigned by		
instructor.		
Objective 3:		
6. Uses proper desoldering procedures.		
Criterion: Meets procedures described in text		
Electronics Assembly and Fabrication Methods, pp. 97-98.		
7. Selects correct component(s).		
Criterion: Those selected match those that are faulty.		
8. Select proper soldering equipment when appropriate.		
Criterion: Compliance with instructor key.		
9. Uses proper soldering procedures.		
Criterion: Text Basic Radio, Part II, pp. 8, 9.		
10. Component(s) installation meets professional standards.		
Criterion: Electronics Assembly and Fabrication Methods,		
pp. 162-169.		
11. The student will repair the television set.		
Criterion: The set operates according to manufacturer's		
specifications.		
12. Test is completed in appropriate time span.		
Criterion: Time limit will be specified according to problem.		

Student must meet criterion on all line items to obtain an overall score of satisfactory.

COLOR TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:

Diagnosed by:

Date:

Exercise or symptom number:

Checked by:

Comments:

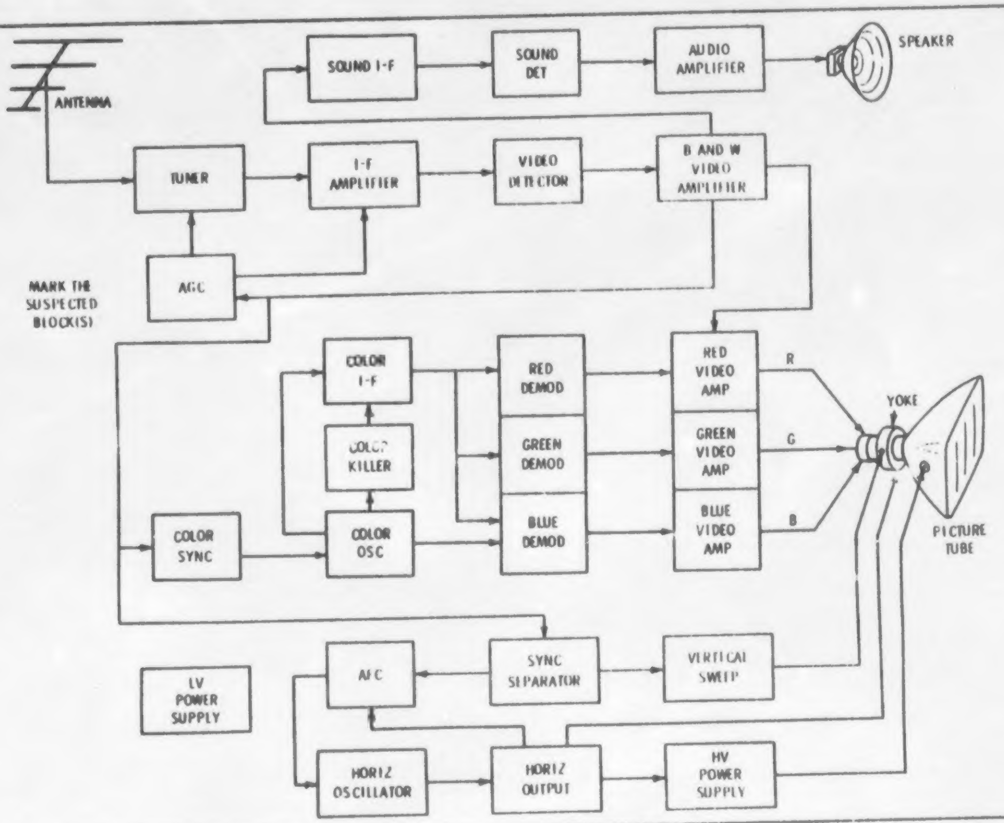
Evaluation:

Set identification:

OBSERVED SYMPTOMS

SOUND	VIDEO	RASTER	COLOR

DIAGNOSIS (suspected block) and comments:



ANTENNA
TUNER
AGC
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
COLOR I-F
COLOR KILLER
COLOR SYNC
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

MARK THE SUSPECTED BLOCK(S)

CORRECTIVE ACTION (suggested or taken):

COLOR TELEVISION DIAGNOSIS SHEET

1.

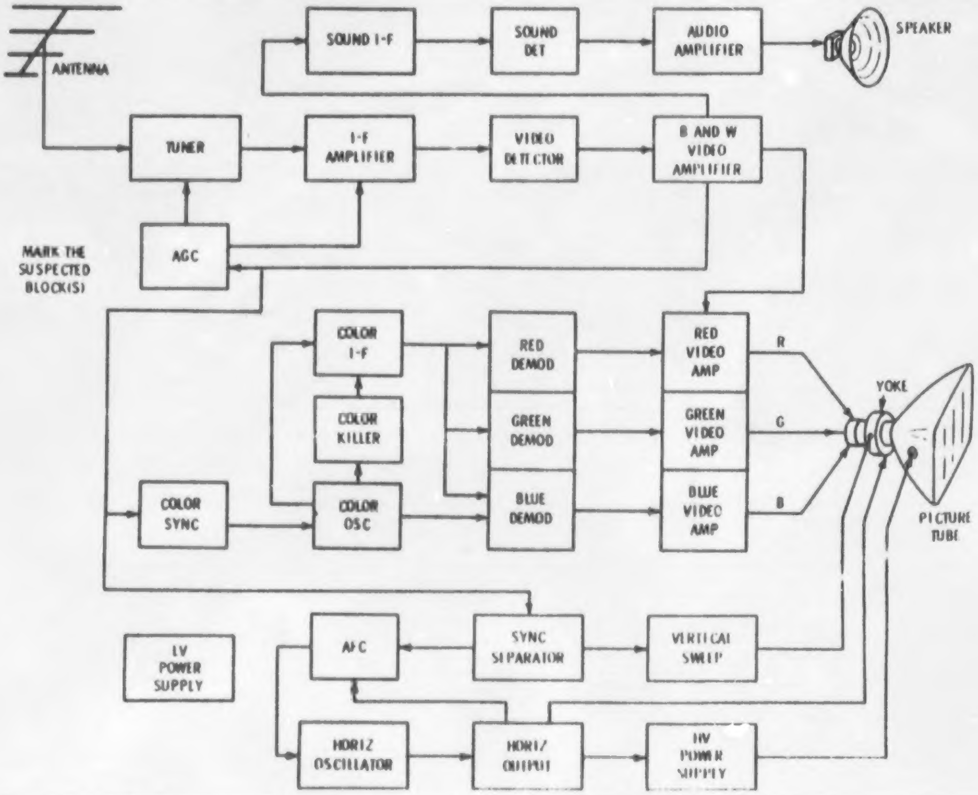
Lesson or film strip number:	**Diagnosed by:**	**Date:**
Exercise or symptom number:	**Checked by:** **Comments:**	
Set identification:		**Evaluation:**

2.

OBSERVED SYMPTOMS			
SOUND	**VIDEO**	**RASTER**	**COLOR**

DIAGNOSIS (suspected block) and comments:

3.


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
MARK THE SUSPECTED BLOCK(S)
AGC
COLOR I-F
COLOR KILLER
COLOR SYNC
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

CORRECTIVE ACTION (suggested or taken):

RESISTANCE READINGS

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource.

Identifies the section(s) that contains the problem(s).

check for audio
check for video
check for raster
check for color sync
checks for color loss
checks for color

OBJECTIVE 2: Troubleshooting

Line item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to the diagram, when appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses color generator according to manufacturer's directions.
Identifies and records the particular problem.

OBJECTIVE 3:

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

File Code: 77.04.09.00.A2-1

Date Published: 12/28/76

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Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: TELEVISION TROUBLESHOOTING SUMMARY

RATIONALE:

There are special features of television receivers, like automatic fine tuning, color control and remote control circuits that need servicing. The operational characteristics of these special feature stages is necessary to diagnose problems in them and make corrective repairs. In a television repair shop, problem may be in any part of a television receiver. Practice in general troubleshooting procedures and correcting malfunctions is advantageous to the student that is ready to begin an entry level television service person position.

PREREQUISITIES:

Unit 77.04.08. Television Color Section Troubles

OBJECTIVES:

Students will recognize symptoms of trouble; diagnose difficulties; make necessary adjustments; remove, repair and replace components for the special features of television, like remote control and automatic tuning and any other part of the television receiver, using tools and equipment.

RESOURCES:

Printed Materials

Black & White Television Diagnosis Sheets.
Color Television Diagnosis Sheets.
Photofact Service. Howard W. Sams and Company, Inc., 4300 West 62nd Street, Indianapolis, Indiana.
Television Symptom Diagnosis: An Entry Into T.V. Servicing. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.
Television Symptom Diagnosis: Student Response Manual. Richard W. Tinnell, Howard W. Sams and Company, Inc., 1971.

Audio/Visuals

Super 8 Sound Film:
Television Symptom Diagnosis Series TSD-133 (Film Loop #33), Hickok Teaching Systems, Inc., Woburn, Massachusetts.

Principal Author(s): L. Leland & B. Vetter

Equipment

Alignment tool set
Capacitor checker
Cathode ray tube checker
Color T.V.
Desoldering tools
Iron, Soldering
Keyed rainbow/Bar-Dot generator
Kit, Service Master 99SM or equivalent, Xcelite 99SM Kit, Jensen Tools and Alloys, 4117 North 44th Street, Phoenix, Arizona.
Meter, volt-ohm
Oscilloscope
Probe, high voltage (30 kv)
Projector, Super 8 Sound Film, Model 60, Hickok Teaching Systems, Inc.
Television Analyst, B & K Model 1077B, Dynascan Corporation, 1801 W. Belle Plaine Avenue, Chicago, Illinois.
Television Training Kit, CRT & Enclosure KT-186, Color Training Chassis,
Tools, soldering
Transistor F.E.T. checker
Vacuum tube checker

GENERAL INSTRUCTIONS:

This Unit consists of six Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this Unit is as follows:

(1) Read the first assigned Learning Activity Package (LAP).
(2) Begin and complete the first assigned LAP.
(3) Take and score the LAP test.
(4) Turn in the LAP test answer sheet.
(5) Determine the reason for any missed items on the LAP test.
(6) Proceed to and complete the next assigned LAP in the unit.
(7) Complete all required LAPs for the unit by following steps 3 through 6.
(8) Take the unit tests as described in the Unit LEG "Evaluation Procedures".
(9) Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Special Receiver Features
.02 Identifying Special Receiver Features
.03 Troubleshooting Summary
.04 Localizing TV Troubles
.05 Symptoms Indicating Location of TV Troubles
.06 Diagnosing Three Television Sets

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH:

After reading this Unit guide, go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

You will be expected to apply the knowledge and skills acquired in your previous activities to the performance of this Unit.

Student: ______________________ File Code: 77.04.09.00.A2-2

Date: ______________________ Date Published: 9-24-74

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UNIT PRETEST: TELEVISION TROUBLESHOOTING SUMMARY

77.04.09.01.

1. What do the letters "A.B.L." stand for in a T.V. set?

   A. automatic blue limiter
   B. automatic brightness limiter
   C. automatic "berg" limiter
   D. automated brilliance linearity

2. What is the frequency of the I.F. section of a T.V. set?

   A. 41.75 MHz
   B. 45.75 MHz
   C. 41.25 MHz
   D. 44.25 MHz

3. What is another term for a voltage regulator in a T.V. set?

   A. switch
   B. triad
   C. triac
   D. amplifier filter

4. What device in a T.V. set picks up the electronic impulses from the remote control unit?

   A. microphone
   B. speaker
   C. service head
   D. transformer

5. What does "F.T.I." stand for in a T.V. set?

   A. field effect transistor
   B. fine tuning eye
   C. fine tuning interference
   D. fine tuning indicator

77.04.09.02.

6. Which of the following devices is most commonly used in modern A.F.T. systems?

   A. transformer
   B. transistor
   C. tube
   D. IC

7. The two types of remote control incorporated in modern T.V. sets are:

   A. wire and wireless.
   B. automatic and hand-held.
   C. automatic and wire.
   D. wireless and hand-held.

8. What is used in the mechanical type of wireless remote control for sending signals?

   A. "clicker"
   B. push buttons
   C. tuning fork
   D. clapper

9. The output of the A.F.T. circuit goes to the:

   A. tuner oscillator of a T.V. set.
   B. tuner mixer of a T.V. set.
   C. first I.F. amp of a T.V. set.
   D. third I.F. amp of a T.V. set.

10. In a T.V. set equipped with A.F.T., in which stage will the A.F.T. monitor the signal?

   A. video output
   B. third I.F. stage
   C. first I.F. stage
   D. second I.F. stage

77.04.09.03.

11. How many stages could the low voltage power supply affect?

   A. all
   B. 4
   C. 5
   D. 6

12. The basic number of color problems that will appear in a T.V. is:

   A. 2.
   B. 5.
   C. 4.
   D. 7.

13. What is used to determine whether or not a problem exists in the R.F. or I.F. stages of a T.V. set?

    A. B + K generator
    B. V.O.M.
    C. scope
    D. atmospheric snow

14. The volume control is located in the:

    A. output stage.
    B. I.F. stage.
    C. detector stage.
    D. amplifier stage.

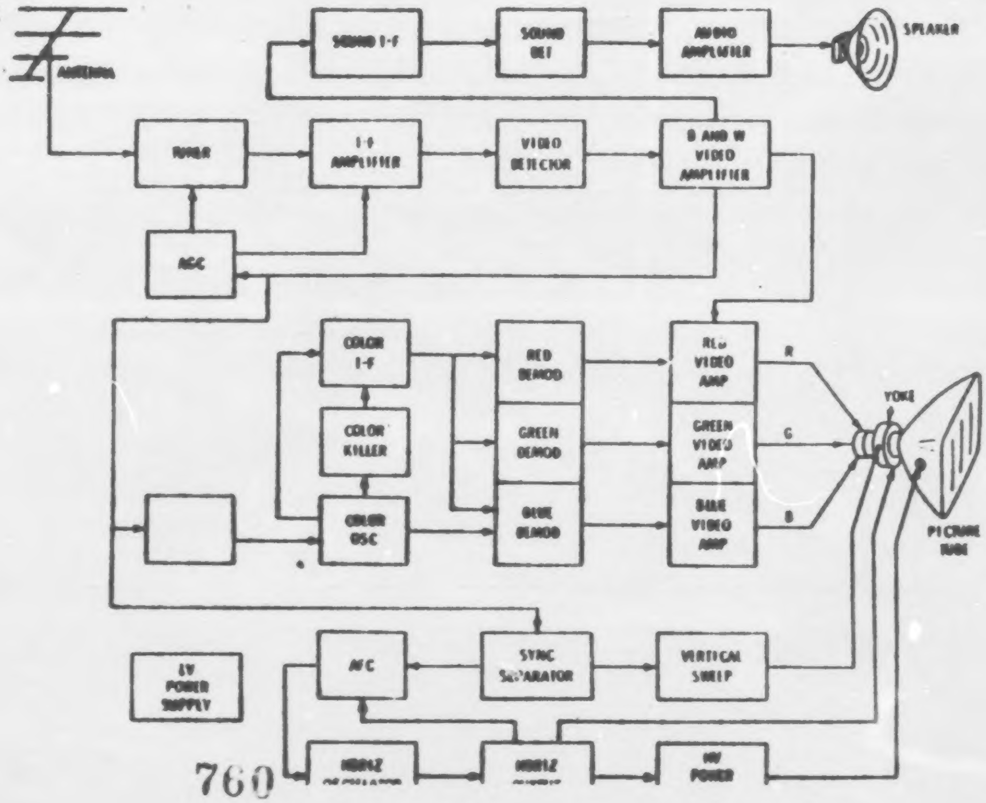
15. How many sections of a T.V. can affect the audio?

    A. 2
    B. 1
    C. 4
    D. 3

77.04.09.04.

16. What section is missing from the block diagram provided below?

    A. color sync
    B. A.C.C.
    C. A.G.C. amp
    D. flyback


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
AGC
COLOR I-F
COLOR KILLER
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ
HORIZ
HV POWER

77.04.09.05.

17. What is the probable cause of figure #3 in the T.V. Test Pamphlet?
    - A. burst amp
    - B. oscillator
    - C. picture tube
    - D. color sync

18. Refer to figure #13 in the T.V. Test Pamphlet. What section could cause a picture to look like this?
    - A. burst amp
    - B. color video amp
    - C. oscillator
    - D. A.C.C.

19. What section of a color T.V. could cause a picture to look like figure #6 in the T.V. Test Pamphlet?
    - A. demodulator
    - B. color killer
    - C. oscillator
    - D. sync stage

77.04.09.06.

20. What section of a color T.V. could cause a picture to appear like figure #15 in the T.V. Test Pamphlet?
    - A. burst amp
    - B. demodulator
    - C. sync stage
    - D. picture tube

UNIT PRETEST ANSWER KEY: TELEVISION TROUBLESHOOTING SUMMARY

LAP 01	1.	B
	2.	B
	3.	C
	4.	A
	5.	D
LAP 02	6.	D
	7.	A
	8.	C
	9.	A
	10.	B
LAP 03	11.	A
	12.	C
	13.	D
	14.	D
	15.	D
LAP 04	16.	A
LAP 05	17.	C
	18.	B
	19.	A
LAP 06	20.	A

File Code: 77.04.09.01.A2-0

Date Published: 12/28/76

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Special Receiver Features

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in the special circuits section of a television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Identifying Special Receiver Features" LAP test and is taken after completing that LAP.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 17 in the above resource.
2. Answer the review questions for Chapter 17.
3. Check your answers with the answer key.
4. Proceed to the next LAP.

Principal Author(s): R. Arneson & B. Vetter

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Identifying Special Receiver Features

OBJECTIVE:

Sketch a schematic diagram of a television special circuit.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Sketch a schematic diagram of one of the following special receiver circuits that are found on pages 143-152 in the above resource:
   - A. Automatic Chroma Control
   - B. Automatic Fine Tuner
   - C. Line-Voltage Regulator
   - D. Automatic Brightness Limiter
   - E. Fine-Tuning Indicator
   - F. Electronic Wireless Remote Control
2. Write a short summary of the circuit operation and function.
3. Give the sketch and summary to the instructor.
4. Take the LAP test.

Principal Author(s): R. Arneson, R. Schuster & B. Vetter

Student: ______________________ File Code: 77.04.09.01.A2-2
77.04.09.02.A2-2

Date: ______________________ Date Published: 12/2/77

Mountain-Plains Education &
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LAP TEST: SPECIAL RECEIVER FEATURES/IDENTIFYING SPECIAL RECEIVER FEATURES

77.04.09.01.

1. What is another term for a voltage regulator in a T.V. set?

   a. triac.
   b. amplifier filter.
   c. switch.
   d. triad.

2. What does "F.T.I." stand for in a T.V. set?

   a. fine tuning isolator.
   b. field transistor indicator.
   c. fine tuning indicator.
   d. fine tuning interference.

3. What device in a T.V. set picks up the electronic impulses from the remote control unit?

   a. transformer.
   b. speaker.
   c. microphone.
   d. service head.

4. What is the frequency of the video I.F. section of a T.V. set?

   a. 45.75 MHZ
   b. 44.25 MHZ
   c. 41.25 MHZ
   d. 41.75 MHZ

5. What do the letters "A.B.L." stand for in a T.V. set?

   a. automatic blue limiter.
   b. automatic "berg" limiter.
   c. automatic brightness limiter.
   d. automated brilliance linearity.

77.04.09.02.

6. In a T.V. set equipped with A.F.T., in which stage will the A.F.T. monitor the signal?

   a. third I.F. stage.
   b. second I.F. stage.
   c. first I.F. stage.
   d. video output.

77.04.09.02. (continued)

7. The two types of remote control incorporated in modern T.V. sets are:

    a. wire and wireless.
    b. wireless and hand-held.
    c. automatic and wire.
    d. automatic and hand-held.

8. Which of the following devices is most commonly used in modern A.F.T. systems?

    a. transistor.
    b. transformer.
    c. IC.
    d. tube.

9. The output of the A.F.T. circuit goes to the:

    a. tuner oscillator of a T.V. set.
    b. tuner mixer of a T.V. set.
    c. first I.F. amp of a T.V. set.
    d. third I.F. amp of a T.V. set.

10. If no color signal is present and the color I.F. is turned off, what will be seen on the screen?

    a. colored snow.
    b. nothing.
    c. rainbow pattern.
    d. snow.

LAP TEST ANSWER KEY: SPECIAL RECEIVER FEATURES/ IDENTIFYING SPECIAL RECEIVER FEATURES

LAP 01	1.	a
	2.	c
	3.	c
	4.	a
	5.	c
LAP 02	6.	a
	7.	a
	8.	c
	9.	a
	10.	d

File Code: 77.04.09.03.A2-0

Date Published: 12/28/76

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Troubleshooting Summary

OBJECTIVE:

Describe typical symptoms commonly related to malfunctions in any section of a television set.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Television Symptom Diagnosis: An Entry Into T.V. Servicing, Tinnell.

PROCEDURE:

1. Read Chapter 18 in the above resource.
2. Complete the Practice Exercises for Chapter 18.
3. Check your answers with the answer key.
4. Take the LAP test.

Principal Author(s): R. Arneson, P. Schuster & B. Vetter

Student: ______________________ **File Code:** 77.04.09.03.A2-2

Date: ______________________ **Date Published:** 12/2/77

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Glasgow AFB, Montana 59231**

LAP TEST: TROUBLESHOOTING SUMMARY

1. How many sections can affect the video in a T.V.?

   a. 4
   b. 5
   c. 3
   d. 6

2. In what section of a color set do CRT problems generally appear?

   a. sweep.
   b. sync.
   c. color.
   d. video.

3. In what section of a T.V. is the A.G.C. control placed?

   a. A.G.C.
   b. video I.F.
   c. audio.
   d. video.

4. How many sections of a T.V. can affect the audio?

   a. 3
   b. 1
   c. 4
   d. 2

5. How many sections of a T.V. could affect the hi-voltage supply?

   a. 2
   b. 3
   c. 4
   d. 1

6. How many different sections can affect raster problems?

   a. 3
   b. 4
   c. 2
   d. 1

7. What is used to determine whether or not a problem exists in the R.F. or I.F. stages of a T.V. set?

   a. B + K generator.
   b. V.O.M.
   c. atmospheric snow.
   d. scope.

8. How many sections could affect the height and linearity of the raster?

   a. 3
   b. 1
   c. 2
   d. 4

9. The volume control is located in the:

   a. output stage.
   b. I.F. stage.
   c. amplifier stage.
   d. detector stage.

10. Which of the following might be the first step in logically troubleshooting a T.V. set?

    a. isolating the trouble areas.
    b. connect and adjust the set.
    c. classify symptoms.
    d. localizing the troubles.

LAP TEST ANSWER KEY: TROUBLESHOOTING SUMMARY

1. b
2. c
3. a
4. a
5. a
6. b
7. c
8. c
9. c
10. b

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Date Published: 12/28/76

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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Localizing TV Troubles

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in a television set, identify the section in which the trouble exists.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Three Television Sets" LAP test and is taken After completing that LAP.

RESOURCES:

Television Symptom Diagnosis: Student Response Manual, Tinnell.

PROCEDURE:

1. Read page 217 in the response manual.
2. Complete the Practice Exercises for Lesson #32 on pages 217-221.
3. Check your answer with the answer key.
4. Proceed to the next LAP

Principal Author(s): R. Arneson & P. Schuster

File Code: 77.04.09.05.A2-0

Date Published: 12/28/76

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Learning Activity Package

Student: ______________

Date: ______________

PERFORMANCE ACTIVITY: Symptoms Indicating Location of TV Troubles

OBJECTIVE:

Given typical symptoms commonly related to malfunctions in any section of a television set, record comments and diagnosis along with suggested corrective action on a diagnosis.

EVALUATION PRECEDURE:

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test that is combined with "Diagnosing Three Television Sets" LAP test and is taken after completing that LAP.

RESOURCES:

Color Television Diagnosis Sheet.

Film Loop #33, Symptom Set IV.

Projector

RROCEDURE:

1. View Film Loop #33 as indicated in the resources and complete the film loop activities.
2. Check your activity answers with the answer key.
3. Proceed to the next LAP.

Principal Author(s): R. Arneson & P. Schuster

File Code: 77.04.09.06.A2-0

Date Published: 12/28/76

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Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: Diagnosing Three Television Sets

OBJECTIVE:

Given three television sets with problem(s) related to malfunctions commonly found in all sections of a television set, diagnose and record on three diagnosis sheets.

EVALUATION PROCEDURE:

Successful completion of this LAP is determined by correctly answering at least 8 out of 10 items on a multiple-choice test.

RESOURCES:

Black & White Television Diagnosis Sheet.
Color Television Diagnosis Sheet.
Photofact Service, Sams.

Alignment tool set
Capacitor checker
Hand tools
Keyed rainbow/Bar-Dot generator
High voltage probe (30 kv)
Oscilloscope
Soldering & desoldering tools
TSD Trainer or real television set
Transistor checker
Television Analyst, B & K model 1077B
Vacuum tube checker

PROCEDURE:

1. Go to the instructor and have him assign a work station where you will complete diagnosing three television sets.
2. Turn on television set and diagnose for possible malfunction(s).
3. After three diagnoses are completed, fill in all requested data on three diagnosis sheets.

Principal Author(s): R. Arneson, P. Schuster & B. Vetter

Student: ______________________ File Code: 77.04.09.04.A2-2
77.04.09.05.A2-2
77.04.09.06.A2-2

Date: ______________________ Date Published: 12/2/77

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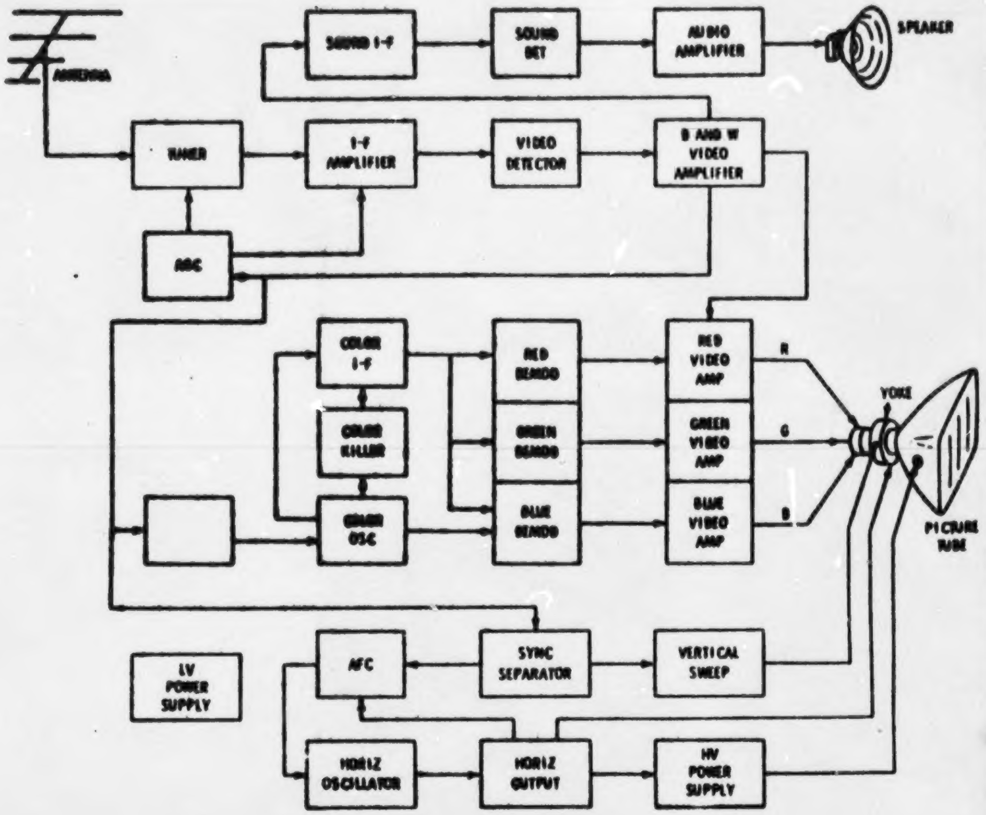
LAP TEST: LOCALIZING T.V. TROUBLES/SYMPTOMS INDICATING LOCATION OF T.V. TROUBLES/DIAGNOSING THREE TELEVISION SETS

77.04.09.04.

1. What section is missing from the block diagram provided below?

   a. color sync.
   b. A.G.C. amp.
   c. flyback.
   d. A.C.C.


ANTENNA
SOUND I-F
SOUND DET
AUDIO AMPLIFIER
SPEAKER
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
AGC
COLOR I-F
COLOR KILLER
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ OSCILLATOR
HORIZ OUTPUT
HV POWER SUPPLY

77.04.09.05.

2. Which of the following might cause the picture to appear like figure #12 in the T.V. Test Pamphlet?

   a. burst amp.
   b. color killer.
   c. picture tube.
   d. color I.F.

3. What is the probable cause of figure #3 in the T.V. Test Pamphlet?

   a. oscillator.
   b. color sync.
   c. picture tube.
   d. burst amp.

77.04.09.05. (continued)

4. Refer to figure #13 in the T.V. Test Pamphlet. What section could cause a picture to look like this?

   a. burst amp.
   b. oscillator.
   c. color video amp.
   d. A.C.C.

5. Which of the following sections could cause a picture to look like figure #2 in the T.V. Test Pamphlet?

   a. color killer.
   b. demodulator.
   c. color oscillator.
   d. picture tube.

6. What is wrong with the picture depicted in figure #1 of the T.V. Test Pamphlet?

   a. color killer.
   b. picture tube.
   c. nothing.
   d. color generator.

7. What section of a color T.V. could cause a picture to look like figure #6 in the T.V. Test Pamphlet?

   a. color killer.
   b. oscillator.
   c. sync stage.
   d. demodulator.

77.04.09.06.

8. What section of a color T.V. could cause a picture to appear like figure #15 in the T.V. Test Pamphlet?

   a. picture tube.
   b. demodualtor.
   c. burst amp.
   d. sync stage.

77.04.09.06. (continued)

9. What might cause a picture to look like figure #7 in the T.V. Test Pamphlet?

   a. color I.F.
   b. A.C.C.
   c. burst section.
   d. color amp.

10. The probable cause of figure #5 in the T.V. Test Pamphlet is the:

    a. A.C.C.
    b. burst amp.
    c. color killer.
    d. demodulator.

77.04.09.04.A2-2
77.04.09.05.A2-2
77.04.09.06.A2-2

LAP TEST ANSWER KEY: LOCALIZING T.V. TROUBLES/SYMPTOMS INDICATING LOCATION OF T.V. TROUBLES/DIAGNOSING THREE TELEVISION SETS

LAP 04	1.	a
LAP 05	2.	c
	3.	c
	4.	c
	5.	c
	6.	c
	7.	d
LAP 06	8.	c
	9.	d
	10.	d

Student: ____________________ File Code: 77.04.09.00.B2-2

Date: ____________________ Date Published: 7/25/75

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UNIT POST TEST: TELEVISION TROUBLESHOOTING SUMMARY

77.04.09.01.

1. What is the frequency of the I.F. section of a T.V. set?

   A. 45.75 MHZ
   B. 44.25 MHZ
   C. 41.25 MHZ
   D. 41.75 MHZ

2. What does "F.T.I." stand for in a T.V. set?

   A. fine tuning eye
   B. fine tuning indicator
   C. field effect transistor
   D. fine tuning interference

3. What is another term for a voltage regulator in a T.V. set?

   A. triad
   B. amplifier filter
   C. triac
   D. switch

4. What do the letters A.B.L. stand for in a T.V. set?

   A. automatic brightness limiter
   B. automatic blue limiter
   C. automatic "berg" linear control
   D. automatic brilliance linearity control

5. What device in a T.V. set picks up the electronic impulses from the remote control unit?

   A. speaker
   B. microphone
   C. service head
   D. transformer

77.04.09.02.

6. What is used in the mechanical type of wireless remote control for sending signals?

    A. "clicker"
    B. push buttons
    C. tuning fork
    D. clapper

7. The output of the A.F.T. circuit goes to the:

    A. third I.F. amp of a T.V. set.
    B. tuner oscillator of a T.V. set.
    C. tuner mixer of a T.V. set.
    D. first I.F. amp of a T.V. set.

8. What is used in the electronic type of wireless remote control for sending signals?

    A. clapper
    B. oscillator circuit
    C. tuning fork
    D. battery

9. The two types of remote control incorporated in modern T.V. sets are:

    A. automatic and hand-held.
    B. automatic and wire.
    C. wireless and hand-held.
    D. wire and wireless.

10. If no color signal is present and the color I.F. is turned off, what will be seen on the screen?

    A. snow
    B. nothing
    C. rainbow pattern
    D. colored snow

77.04.09.03.

11. How many sections will affect raster width?

    A. 2
    B. 1
    C. 3
    D. 4

12. Which of the following might be the first step in logically troubleshooting a T.V. set?

A. connect and adjust the set
B. classify symptoms
C. localize the troubles
D. isolate the trouble areas

13. How many sections of a T.V. could affect the hi-voltage supply?

A. 2
B. 1
C. 3
D. 4

14. How many different sections can affect raster problems?

A. 1
B. 2
C. 3
D. 4

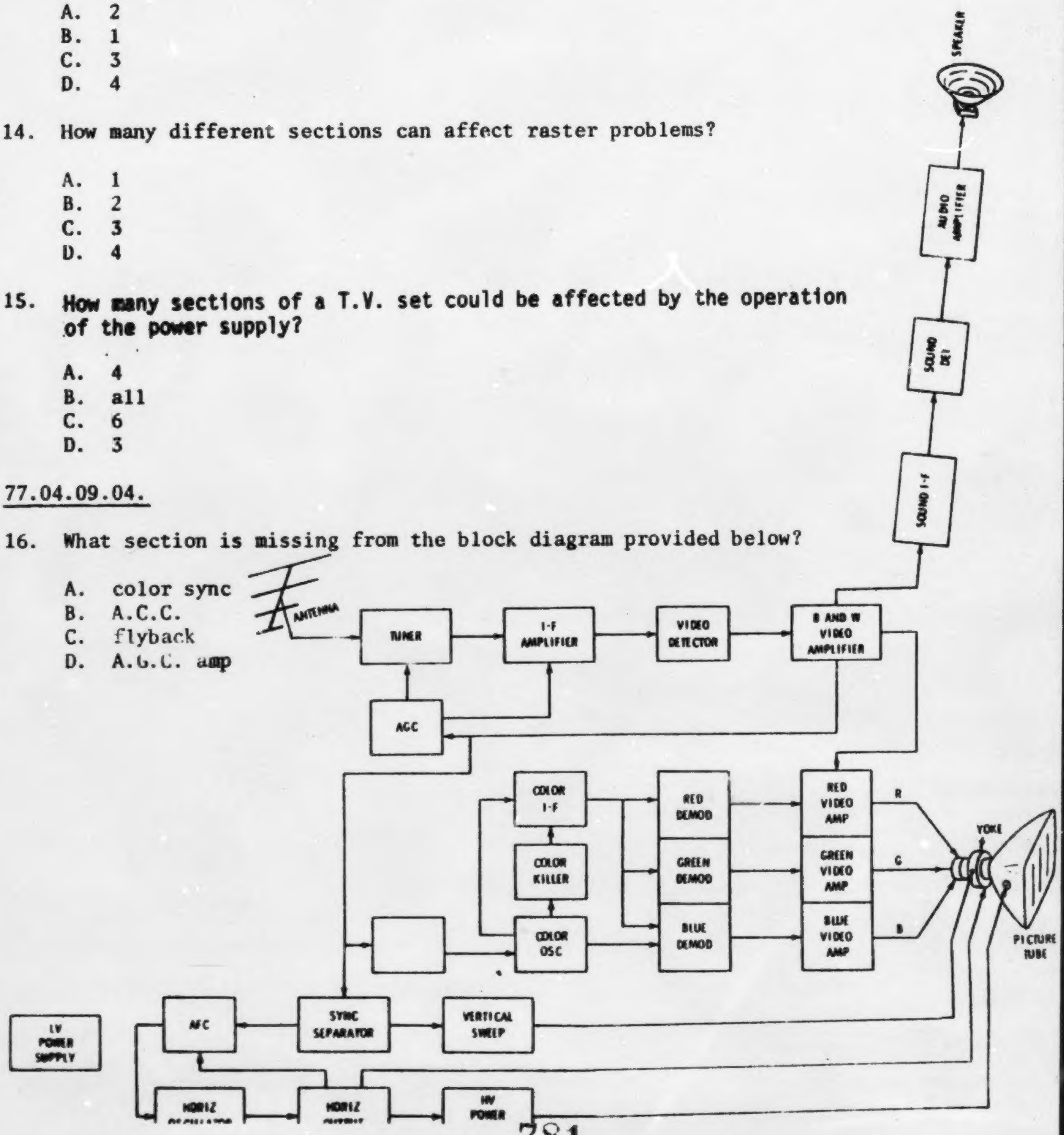
15. **How many sections of a T.V. set could be affected by the operation of the power supply?**

A. 4
B. all
C. 6
D. 3

77.04.09.04.

16. What section is missing from the block diagram provided below?

A. color sync
B. A.C.C.
C. flyback
D. A.G.C. amp


SPEAKER
AUDIO AMPLIFIER
SOUND DET
SOUND I-F
ANTENNA
TUNER
I-F AMPLIFIER
VIDEO DETECTOR
B AND W VIDEO AMPLIFIER
AGC
COLOR I-F
COLOR KILLER
COLOR OSC
RED DEMOD
GREEN DEMOD
BLUE DEMOD
RED VIDEO AMP
GREEN VIDEO AMP
BLUE VIDEO AMP
R
G
B
YOKE
PICTURE TUBE
LV POWER SUPPLY
AFC
SYNC SEPARATOR
VERTICAL SWEEP
HORIZ
HORIZ
HV POWER

77.04.09.05.

17. Which of the following might cause the picture to appear like figure #3 in the T.V. Test Pamphlet?

    A. color killer
    B. picture tube
    C. color I.F.
    D. burst amp

18. What is wrong with the picture depicted in figure #1 of the T.V. Test Pamphlet?

    A. color generator
    B. color killer
    C. picture tube
    D. nothing

19. Which of the following sections could cause a picture to look like figure #2 in the T.V. Test Pamphlet.

    A. color oscillator
    B. picture tube
    C. color killer
    D. demodulator

77.04.09.06.

20. What section of a color T.V. could cause a picture to look like figure #6 in the T.V. Test Pamphlet?

    A. oscillator
    B. sync stage
    C. color killer
    D. demodulator

UNIT POST TEST ANSWER KEY: TELEVISION TROUBLESHOOTING SUMMARY

LAP 01	1.	A
	2.	B
	3.	C
	4.	A
	5.	B
LAP 02	6.	C
	7.	B
	8.	B
	9.	D
	10.	A
LAP 03	11.	B
	12.	A
	13.	A
	14.	D
	15.	B
LAP 04	16.	A
LAP 05	17.	B
	18.	D
	19.	A
LAP 06	20.	D

Student: ______________________ File Code: 77.04.05.00.A1-5

Date: ______________________ Date Published: 1-25/75

Mountain-Plains Education &
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Program, Inc.
Glasgow AFB, Montana 59231

Family Pay Number: __________ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: TELEVISION TROUBLESHOOTING SUMMARY

OBJECTIVE 1:

The student will diagnose malfunctions with regard to special section failures.

OBJECTIVE 2:

The student will troubleshoot the problem(s) and locate the [illegible] in the special function section.

OBJECTIVE 3:

The student will do whatever is required to repair the malfunction in that special section.

The term "special section" refers to the following:

1. tuner section
2. A.F.T. section
3. voltage regulator
4. automatic chroma control

TASK:

The student will be given a trainer or B and W television set that has one or more of the following defects:

1. no automatic fine tuning
2. inconsistent voltage
3. inconsistent color intensity

The student will then be expected to diagnose, troubleshoot, localize and repair whatever the defects he is presented with.

ASSIGNMENT:

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

CONDITIONS:

The student will be tested in an environment similar to that of a [illegible] repair shop. He will be supplied with the same tools and reference manuals normally available to radio-TV service personnel. He may receive no assistance from other students or the instructor.

RESOURCES:

Sam's Photofact Service, soldering iron, B & K television analyst, oscilloscope, vacuum tube checker, volt-ohmmeter, desoldering tools, transistor checker, and keyed rainbow/bar-dot generator.

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

Objective 1:		
1. Student will correctly diagnose special function.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate the area of malfunctions with regard to special function failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to special function section.		
Criterion: [illegible] direction.		
4. Localizes the problem with regard to special function failure.		
Criterion: Compliance with instructor key.		
5. Identifies the defective component(s) with regard to special function [illegible]		

Student ______________________ File No. 27.04.03.00.A1-5

Date ______________________ Date Published 11/13/79

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

OVERALL PERFORMANCE: Satisfactory ______ Unsatisfactory ______

Objective 1:		
1. Student will correctly diagnose special function.		
Criterion: Compliance with the instructor key.		
Objective 2:		
2. The student will troubleshoot the problems and locate the area of malfunctions with regard to special function failures.		
Criterion: Compliance with instructor key.		
3. Properly uses equipment with regard to special function section.		
Criterion: Follows manufacturers directions.		
4. Localizes the problem with regard to special function failure.		
Criterion: Compliance with instructor key.		
5. Identifies the problem component(s) with regard to special function failures.		

(Checklist continued)

CRITERION
Met Not Met

Criterion: Identification matches problem assigned by instructor.

Objective 3:

6. Uses proper desoldering procedures.

Criterion: Meets procedures described in text Electronics Assembly and Fabrication Methods, pp. 97-98

7. Selects correct component(s).

Criterion: Those selected match those that are in [illegible].

8. Select proper soldering equipment when appropriate.

Criterion: Compliance with instructor key

9. Uses proper soldering procedures.

Criterion: Text Basic Radio, Part II, pp. 8, 9.

10. Component(s) installation meets professional standards.

Criterion: Electronics Assembly and Fabrication Methods, pp. 162-169.

11. The student will repair the television set.

Criterion: The set operates according to manufacturer's specifications.

12. Test is completed in appropriate time span.

Criterion: Time limit will be specified according to problem.

Student must meet criterion on all line items to obtain an overall score of satisfactory.

COLOR TELEVISION DIAGNOSIS SHEET

Lesson or film strip number:

Diagnosed by: DATA SHEET

Note:

Item or Location   Schematic Reading   Actual Reading

Exercise or symptom number:

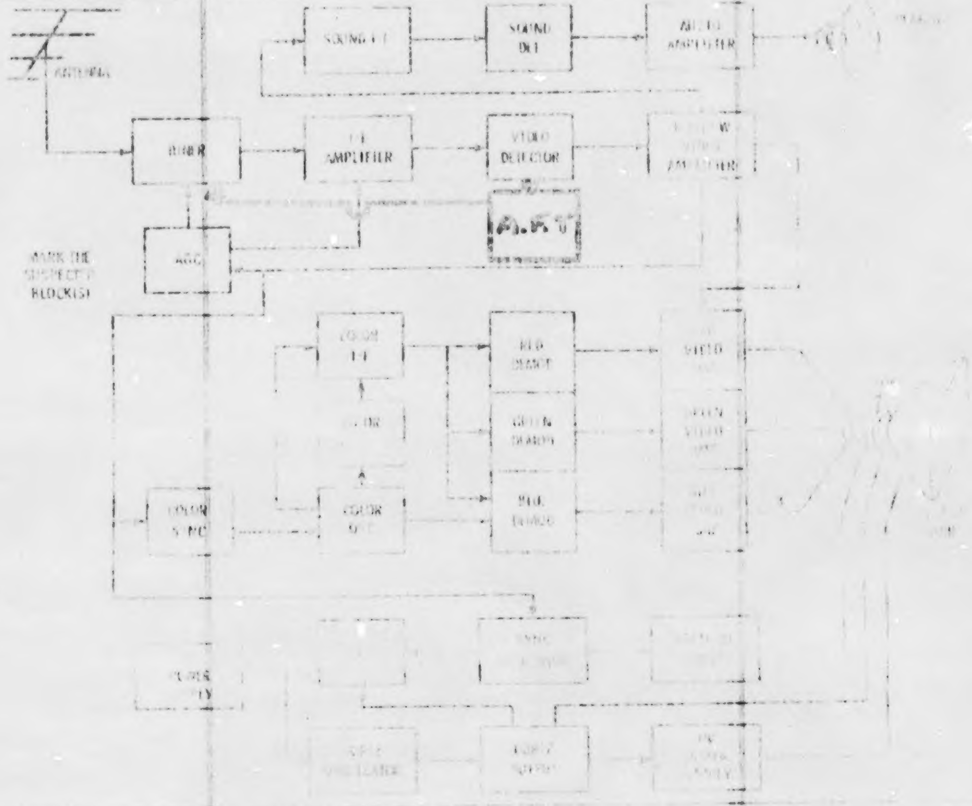
Checked by:

Comments:

Set identification:

OBSERVED SYMPTOMS			
SOUND	VIDEO	RASTER	COLOR

DIAGNOSIS (suspected block) and comments.


ANTENNA
SOUND I.F.
SOUND DET
AUDIO AMPLIFIER
TUNER
I.F. AMPLIFIER
VIDEO DETECTOR
VIDEO AMPLIFIER
A.F.T.
AGC
MARK THE SUSPECTED BLOCK(S)
COLOR I.F.
RED DEMOD
GREEN DEMOD
BLUE DEMOD
VIDEO
GREEN VIDEO AMP
COLOR SYNC
COLOR OSC
POWER SUPPLY
SYNC
OSCILLATOR
SUPPLY

CORRECTIVE ACTION (s...

continue with the remainder of the lesson

VOLTAGE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

OSCILLOSCOPE DATA SHEET

Item or Location	Schematic Reading	Actual Reading

RESISTANCE READINGS

INSTRUCTOR KEY

Item or Location	Schematic Reading	Actual Reading

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the [illegible]

Identifies the section(s) that contains the problem(s).

check for audio	check for A.F.T. action
check for video	checks for snow
check for raster	checks for color

OBJECTIVE 2: Troubleshooting

Line Item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relation to [illegible]
appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when [illegible]
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTIVE [illegible]

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron size.

INSTRUCTOR KEY

OBJECTIVE 1: Diagnosis

Turn the set on.

Check for signal input with tool or instrument that is listed in the resource

Identifies the section(s) that contains the problem(s).

check for audio	check for A.F.T. action
check for video	checks for snow
check for raster	checks for color

OBJECTIVE 2: Troubleshooting

Line Item 2:

Obtains and uses a schematic diagram.
Takes voltage readings in relation to the diagram.
Takes wave-form measurements with oscilloscope in relat[illegible] appropriate.
Uses B and K analyst when appropriate.

Line item 4:

Takes resistance readings in relation to the diagram when appropriate.
Uses VOM according to manufacturer's directions.
Uses oscilloscope according to the manufacturer's directions.

OBJECTI[illegible]

Line item 8:

a. Pencil iron for circuit boards.
b. Anything else up to 150 watt iron-size.

File Code: 77.04.10.00.A2-1

Date Published: 12/29/75

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT: ANTENNAS

RATIONALE:

For a television receiver to operate correctly, it must have a proper signal. Correct procedure for getting the proper signal to the receiver is very important. This unit will assist you in the understanding of UHF and VHF signals and why there is special equipment for each one.

PREREQUISITES:

Unit 109: Television Troubleshooting Summary

OBJECTIVE:

Recognize symptoms of trouble; diagnose difficulties, make necessary adjustments of antenna distribution systems using appropriate tools and equipment.

RESOURCES:

Printed Material

Introduction To Antennas, Louis M. Dezettel, Radio Shack: A Tandy Corp. 1970.

Equipment

- 300 ohm antenna wire
- two-set coupler
- four-set coupler
- interference filter
- antenna masting
- hand tools
- UHF antenna
- UHF 300 ohm wire
- Channel 7-13 broadband color antenna
- rotor & control
- guy wire
- standoffs
- wall-thru
- wall plates

Principal Author(s): B. Vetter

GENERAL INSTRUCTIONS:

This Unit consists of five Learning Activity Packages (LAPS). Each LAP will provide specfic information for completion of a learning activity.

The general procedure for this Unit is as follows:

1. Read the first assigned Learning Activity Package (LAP).
2. Begin and complete the first assigned LAP.
3. Take and score the LAP test.
4. Turn in the LAP test answer sheet.
5. Determine the reason for any missed items on the LAP test.
6. Proceed to and complete the next assigned LAP in the unit.
7. Complete all required LAPs for the unit by following steps 1 through 6.
8. Take the unit tests as described in the Unit LEG "Evaluation Procedures".
9. Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Special Antennas for FM
.02 Fringe Area Antennas
.03 Multiple-Set Distribution
.04 Installing a TV Antenna
.05 Antenna Accessories

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test
2. Successful unit completion is meeting the listed criteria for the performance test.

FOLLOW-THROUGH

After you read this Unit guide, read the LAP for the first assigned performance activity. Use the knowledge and skills that you have acquired in the prerequisites for this Unit.

File Code: 77.04.10.01. A2-0

Date Published: 12/28/76

Mountain-Plains Education &
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Learning Activity Package

Student: ____________

Date: ____________

PERFORMANCE ACTIVITY: SPECIAL ANTENNAS FOR FM

OBJECTIVE:

Describe characteristics of antennas used for FM reception.
Construct an indoor FM antenna.

RESOURCES:

INTRODUCTION TO ANTENNAS by Dezettel

300 ohm twin lead antenna wire

PROCEDURE:

Steps

1. Read Chapter 4, "Special Antennas for FM" in the resource listed above.
2. Construct an indoor FM antenna enabling reception of a station of 92.6 MHz.
3. Connect antenna to a FM radio for self-evaluation of antenna construction.
4. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ File Code: 77.04.10.01.A2-2

Date: ______________________ Date Published: 11/29/77

Family Education Program

LAP TEST: SPECIAL ANTENNAS FOR FM

1. The FM frequency band range is?

   a. 88-106 MHZ
   b. 88-108 KHZ
   c. 88-108 MHZ
   d. 88-106 KHZ

2. Where within the T.V. frequency spectrum band does FM start?

   a. high end of Ch. 6.
   b. low end of Ch. 6.
   c. low end of Ch. 7.
   d. low end of Ch. 2.

3. May a B&W television antenna be used for a FM antenna?

   a. no.
   b. yes.
   c. yes, with adaptors.
   d. yes, if used as a yagi.

4. Does a FM tuner have a less sensitive tuner as compared to a television?

   a. yes.
   b. no.
   c. only at night.
   d. about the same.

5. How wide is the FM band

   a. 40 MHZ
   b. 40 KHZ
   c. 20 KHZ
   d. 20 MHZ

6. A dipole about ______ long is considered resonant in the FM band?

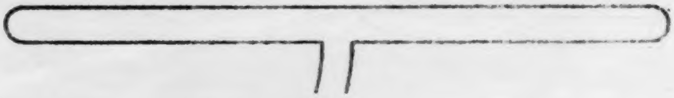
   a. 60 ft.
   b. 60 inches.
   c. 300 inches.
   d. 75 ft.

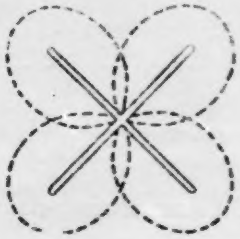
7. What is the electrical impedance of a folded dipole used in FM reception?

   a. 600 ohms.
   b. 300 ohms.
   c. 75 ohms.
   d. 150 ohms.

8. The illustration depicts what type of FM antenna?

   a. single dipole.
   b. single yagi.
   c. folded yagi.
   d. folded dipole.





9. The polar pattern illustrated is of what antenna?

   a. folded dipole.
   b. single dipole.
   c. two single dipole.
   d. two folded dipole.

10. The FM stereo signal includes a _______ signal for use by the multiplex circuit for stereo?

    a. 19 KHZ
    b. 10 KHZ
    c. 20 MHZ
    d. 20 KHZ

LAP TEST ANSWER KEY: SPECIAL ANTENNAS FOR FM

1. c
2. a
3. b
4. b
5. d
6. b
7. b
8. d
9. c
10. b

File Code: 77.04.10.02. A2-0

Date Published: 12/28/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student:

Date:

PERFORMANCE ACTIVITY: Fringe Area Antennas

OBJECTIVE:

Describe characteristics of antennas used for fringe area FM and television reception.

RESOURCES:

Introduction To Antennas by Dezettel

PROCEDURE:

Steps

1. Read Chapter 5, "Fringe Area TV/FM Antennas" in the resource listed above.
2. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.10.02.A2-2

Date: ______________________ **Date Published:** 12/2/77

Family Education Program

LAP TEST: FRINGE AREA ANTENNAS

1. The word "fringe" is defined as the outer area of good T.V. reception somewhere between __________ miles?

   a. 100-200
   b. 150-200
   c. 100-150
   d. 75-150

2. What condition is important as distance in T.V. reception?

   a. atmosphere.
   b. distance between antennas.
   c. line of sight.
   d. terrain.

3. The inverse square law states that signal loss is related to the ________ of the distance?

   a. square.
   b. length.
   c. signal strength.
   d. fringe.

4. At 50 miles, a signal is only one-fourth as strong as at ______ miles?

   a. 75
   b. 100
   c. 25
   d. 200

5. The signal strength at 100 miles is only ________ as strong as at 25 miles?

   a. 1/8
   b. ¼
   c. ½
   d. 1/16

6. How much does light bend around the surface of the earth?

   a. very little.
   b. a little.
   c. a great amount.
   d. not at all.

7. In comparison to light waves, how will radio waves follow the surface of the earth?

   a. much more.
   b. both are the same.
   c. a little more.
   d. radio waves won't follow the surface.

8. At low radio frequencies, how much is the bend as compared to high frequencies?

   a. the same.
   b. a little more.
   c. a lot more.
   d. low frequencies don't bend.

9. How much bend is there in waves that are in the VHF frequencies?

   a. considerable.
   b. very little.
   c. no difference.
   d. VHF doesn't bend.

10. What does the term CATV stand for?

   a. color antenna T.V.
   b. collective antenna T.V.
   c. cable antenna T.V.
   d. comprehensive antenna T.V.

LAP TEST ANSWER KEY: FRINGE AREA ANTENNAS

1. c
2. b
3. a
4. c
5. d
6. a
7. a
8. c
9. b
10. c

File Code: 77.04.10.03.A2-0

Date Published: 12/28/76

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Learning Activity Package

Student: ____________________

Date: ____________________

PERFORMANCE ACTIVITY: Multiple-Set Distribution

OBJECTIVE:

Demonstrate the proper procedure for connecting more then one television receiver to a MATV or a CATV system.

RESOURCES:

Introduction To Antennas by Dezettel
Two set coupler
Four set coupler

PROCEDURE:

Steps

1. Read Chapter 6, "Multiple Set Distribution" in the resource listed above.
2. Obtain the antenna couplers from the instructor.
3. Connect two televisions to the MATV using the two-set coupler.
4. Have the instructor evalute your work.
5. Connect four televisions to the CATV system using the four-set coupler.
6. Have the instructor evalute your work.
7. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.10.03.A2-2

Date: ______________________ **Date Published:** 12/2/77

Family Education Program

LAP TEST: MULTIPLE SET DISTRIBUTION

1. What is the input impedance of a television receiver?

   a. 75 ohms.
   a. 100 ohms.
   c. 300 ohms.
   d. 150 ohms.

2. What happens to the impedance in a television system when two receivers are connected to the same antenna without a coupler?

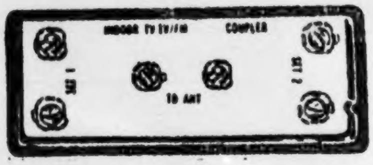
   a. the impedance doubles.
   b. the impedance halves.
   c. the impedance is additive.
   d. nothing.

3. Impedance matching in a antenna system through the use of?

   a. resistors.
   b. transformers.
   c. couplers.
   d. proper antennas.

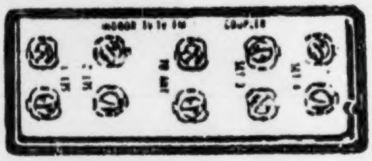
4. The following illustration shows what type of coupler?

   a. three set.
   b. single set.
   c. two set.
   d. four set.



5. How many television receivers may be connected to the following coupler?

   a. one.
   b. two.
   c. four.
   d. five.



6. When using a coupler, why must there be a "load" placed on the unused taps?

   a. to maintain the power.
   b. to keep the impedance matched.
   c. prevent the output transistors from burning up.
   d. so it may be used as a splitter for FM.

7. In an antenna distribution system, where should the coupler be located?

   a. close to the antenna.
   b. close to the television.
   c. where a minimal of cable is needed.
   d. as far from the antenna as you can get.

8. If in the wall lead in installation is used, a good place for the coupler is in the?

   a. basement.
   b. back of the television.
   c. attic.
   d. entry way.

9. What is the impedance of coaxial cable used in antenna systems?

   a. 300 ohms.
   b. 150 ohms.
   c. 75 ohms.
   c. 225 ohms.

10. The only precaution that must be observed in turning twin-lead cable around is to avoid coming near large amounts of?

    a. signal.
    b. heat.
    c. metal.
    d. wall moulding.

LAP TEST ANSWER KEY: MULTIPLE SET DISTRIBUTION

1. c
2. b
3. b
4. c
5. c
6. b
7. c
8. c
9. c
10. c

File Code: 77.04.10.04.A2-0

Date Published: 12/28/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Installing a TV Antenna

OBJECTIVE:

Demonstrate the correct procedure and technique for installing a MATV system.

RESOURCE:

Introduction To Antennas by Dezettel
Channel 7-13 broadband color antenna
20 ft. masting
rotor and control
guy wire
300 ohm flat wire
standoffs
ground wire
tripod
clamps
wall-thru
grounding rod
wall plate

PROCEDURE:

1. Read "How To Install A TV Antenna" in the resource Introduction to Antennas".
2. Obtain the above materials from the instructor.
3. Install the MATV system designated by the instructor.
4. Have the instructor evaluate your work.
5. Take the LAP test.

Principal Author(s): B. Vetter

Student: ______________________ **File Code:** 77.04.10.04.A2-2

Date: ______________________ **Date Published:** 12/2/77

Family Education Program

LAP TEST: INSTALLING A T.V. ANTENNA

1. Where is the most popular place to mount a television antenna?

    a. near the T.V. station.
    b. in the attic.
    c. on the roof.
    d. on the ground.

2. What length does the television antenna masting come in?

    a. 5/10 ft.
    b. 3½/5 ft.
    c. 10/15 ft.
    d. 5/7 ft.

3. How high should the antenna mast be before using guy wire for support?

    a. 5 ft.
    b. 10 ft.
    c. 15 ft.
    d. any height that deems necessary.

4. When running the lead in wire and if it is flat ribbon wire, how should it be twisted?

    a. once every foot.
    b. 2 turns every 5 ft.
    c. 3 turns every 5 ft.
    d. 5 turns every 5 ft.

5. When using stand-offs, what is the maximum distance that they may be placed?

    a. 3 ft.
    b. 5 ft.
    c. 4 ft.
    d. 2½ ft.

6. When placing stand-offs to run wire next to a metal surface, how far should the wire be?

    a. 4 in.
    b. 5 in.
    c. 3 in.
    d. 2 in.

7. You must run a ground wire from the antenna mast to a ground rod to _______.

   a. receive a good signal.
   b. to reduce the SWR.
   c. to increase the SWR.
   d. for lightning damage.

8. Where should the antenna be placed in relation to the source of signal?

   a. pointed towards it.
   b. pointed away from it.
   c. pointed parallel to it.
   d. pointed perpendicular to it.

9. Ground rods should be _______ to _______ ft. in length for best performance?

   a. 5-7
   b. 6-8
   c. 3-5
   d. 4-6

10. What device is used to bring the lead-in through a outside wall?

    a. a lead thru.
    b. a run thru.
    c. a wall thru.
    d. a run thru.

LAP TEST ANSWER KEY: INSTALLING A T.V. ANTENNA

1. c
2. a
3. b
4. c
5. b
6. a
7. d
8. a
9. b
10. c

File Code: 77.04.10.05.A2-0

Date Published: 12/28/76

Mountain-Plains Education &
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Glasgow AFB, Montana 59231

Learning Activity Package

Student: ______________________

Date: ______________________

PERFORMANCE ACTIVITY: Antenna Accessories

OBJECTIVE:

Demonstrate the proper procedure for connecting and using television reception accessories.

RESOURCES:

Introduction To Antennas by Dezettel

signal splitter
UHF signal converter
interference filter
UHF 300 ohm wire

PROCEDURE:

1. Read Chapter 10 in the above resource titled "Accessories For Better TV Enjoyment".
2. Obtain the accessories from the instructor.
3. Connect the UHF antenna to the converter along with the signal splitter.
4. Have the instructor evaluate your work.
5. Take the LAP test.

Principal Author(s): B. Vetter

Student: ____________________ **File Code:** 77.04.10.05.A2-2

Date: ____________________ **Date Published:** 12/2/77

Family Education Program

LAP TEST: ANTENNA ACCESSORIES

1. What is the device called that enables you to bring both VHF and UHF down the same twinlead?

   a. multi-wire.
   b. splitter.
   c. coupler.
   d. transformer.

2. A ________ will divide the signal from the one lead-in into two signals?

   a. coupler.
   b. splitter.
   c. transformer.
   d. converter.

3. A UHF _______ changes the UHF station to VHF enabling reception on older televisions?

   a. splitter.
   b. coupler.
   c. converter.
   d. transformer.

4. Interference in television reception can be cancelled by the use of ________?

   a. couplers.
   b. filters.
   c. splitters.
   d. impedance transformers.

5. What is the impedance of the UHF lead-in?

   a. 300 ohms.
   b. 75 ohms.
   c. 450 ohms.
   d. 150 ohms.

LAP TEST ANSWER KEY: ANTENNA ACCESSORIES

1. b
2. b
3. c
4. b
5. a